

SEPTEMBER, 1959

# **C**ommercial **F**ertilizer and PLANT FOOD INDUSTRY

**Record Crops This Year Indicate  
Good Fertilizer Market for 1960**

**SEE PAGE 19**

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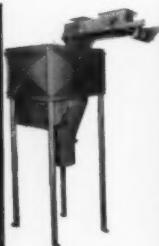
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**Commenting  
 Freely**

by **BRUCE MORAN**

The fertilizing of a lake I know has brought about a schism in the community around it. Should it be done eight times, ten times a year . . . or only four? Did over-fertilization kill the fish, or did they commit piscatorial suicide by lurking in the shallows where the oxygen had been cooked out of the water by the heat?

These are big city people, executives accustomed to basing decisions on facts. But they are confused by hearsay.

September, 1959

Vol. 99, No. 3

Established 1910

September, 1959

# Commercial Fertilizer

and **PLANT FOOD INDUSTRY**

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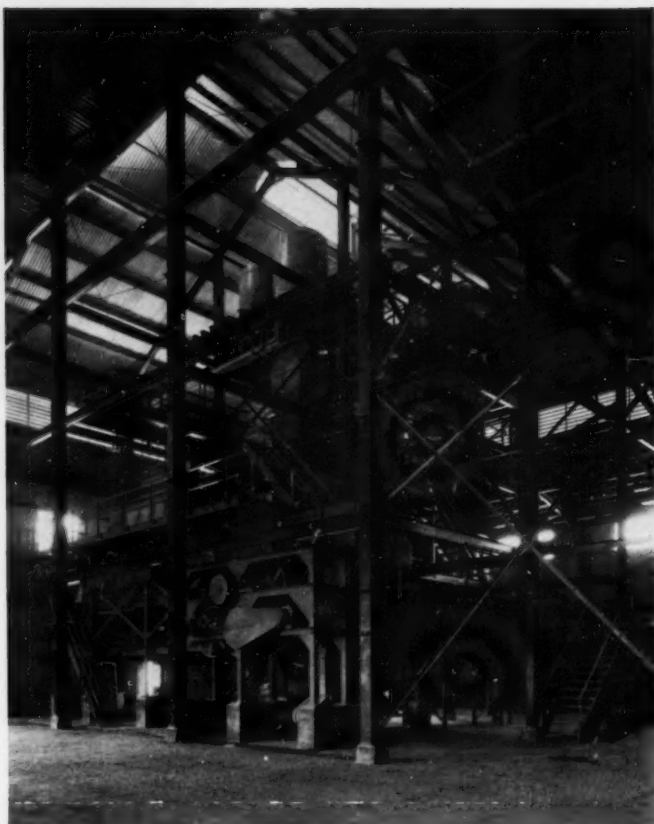
Think how confused simpler folk can be when torn between what Grandpa knew to be a fact, and what these new-fangled agronomists are talking up.

When you, in your full knowledge of fertilizer and its uses, get impatient about the time it takes to put across an idea, remember the lake residents and their confusion. Go more slowly. Tell it more clearly. Tell it oftener. Tell it better.

Time marches on and progress never really halts. It just seems to do so.

**116**

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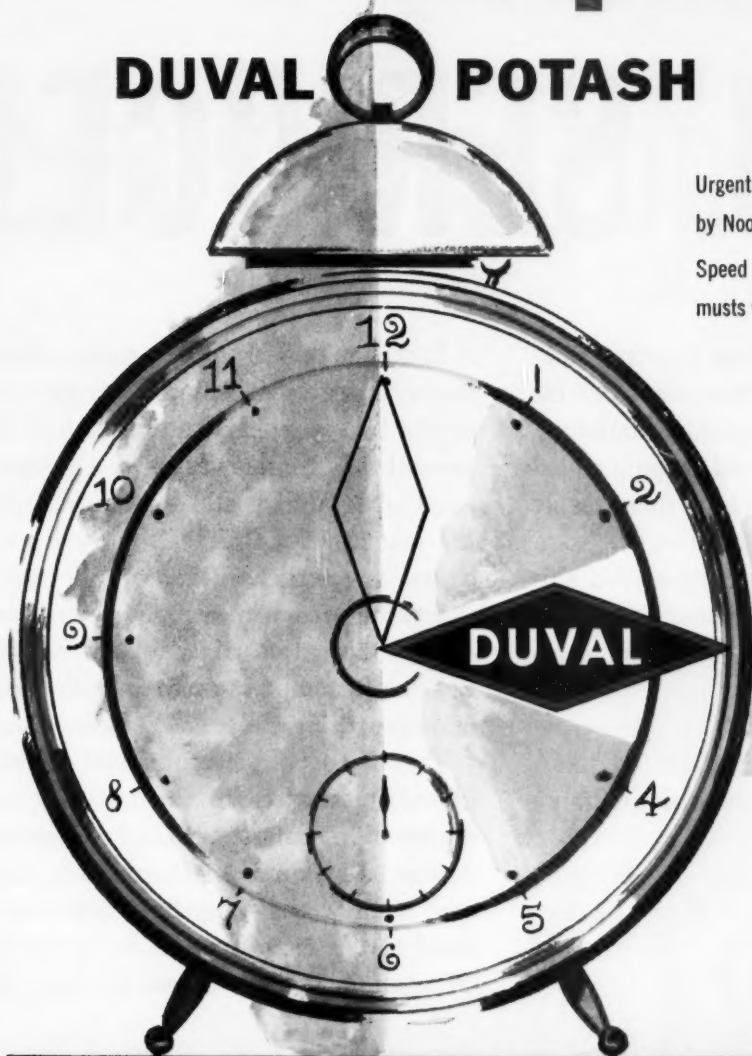
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*Modern fertilizer manufacturing ranges from a relatively simple to a highly complex chemical process both of which demand a complete and integrated service from basic suppliers. One company, alone, offers —*

# TOTAL SERVICE!

There was a time when a man would run a tidy fertilizer business from his roll-top desk. Purchasing, formulating, selling, shipping and bookkeeping added up to a busy . . . but manageable . . . job.

But like most everything else in this world, the fertilizer business has moved ahead. And progress brings problems . . . problems undreamed of just a generation ago. The technical side of the business can be enormously complex. State and federal standards are more exacting. Analyses go higher . . . equipment is more technical and intricate . . . and formulating is more sensitive to the many influences that can upset its fine balance.

It stands to reason that such a thoroughly integrated business can best be served by a supplier who recognizes its present-day complexity — whose interest, understanding and service takes in the *whole picture* rather than just one aspect or another. Because your manufacturing operation cannot be treated as a combination of unrelated activities, any attempt to do so runs the risk of jeopardizing the *whole* process.

That is the very reason IMC consolidated its services to the fertilizer industry. We understand the inseparable nature of modern fertilizer operations and submit that anything less than *total service* is risky service at best. Total service? It is unique to IMC. It



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Putting it another way, IMC's *total service* is a true reflection of our Full Orbit philosophy. Its spirit pervades

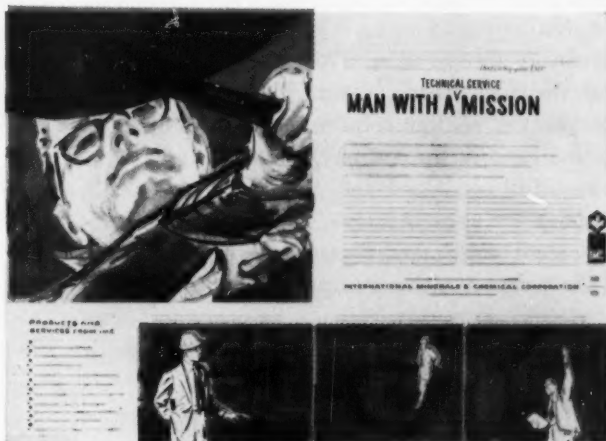
every contact you have with the people of IMC. Our every representative — whether he be salesman, technician, transportation expert or even president — has a mission of constructive assistance to perform each time he calls.

In short, the IMC man is a Man With a Mission!



**50  
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**1909  
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fits of UAL begin. UAL provides nitrogen in both the urea and ammonium form—nitrogen that becomes available at a rate closely paralleling plant requirements. Nitrogen from Du Pont UAL is also leach-resistant; remains in the root zone long after other forms have been exhausted.

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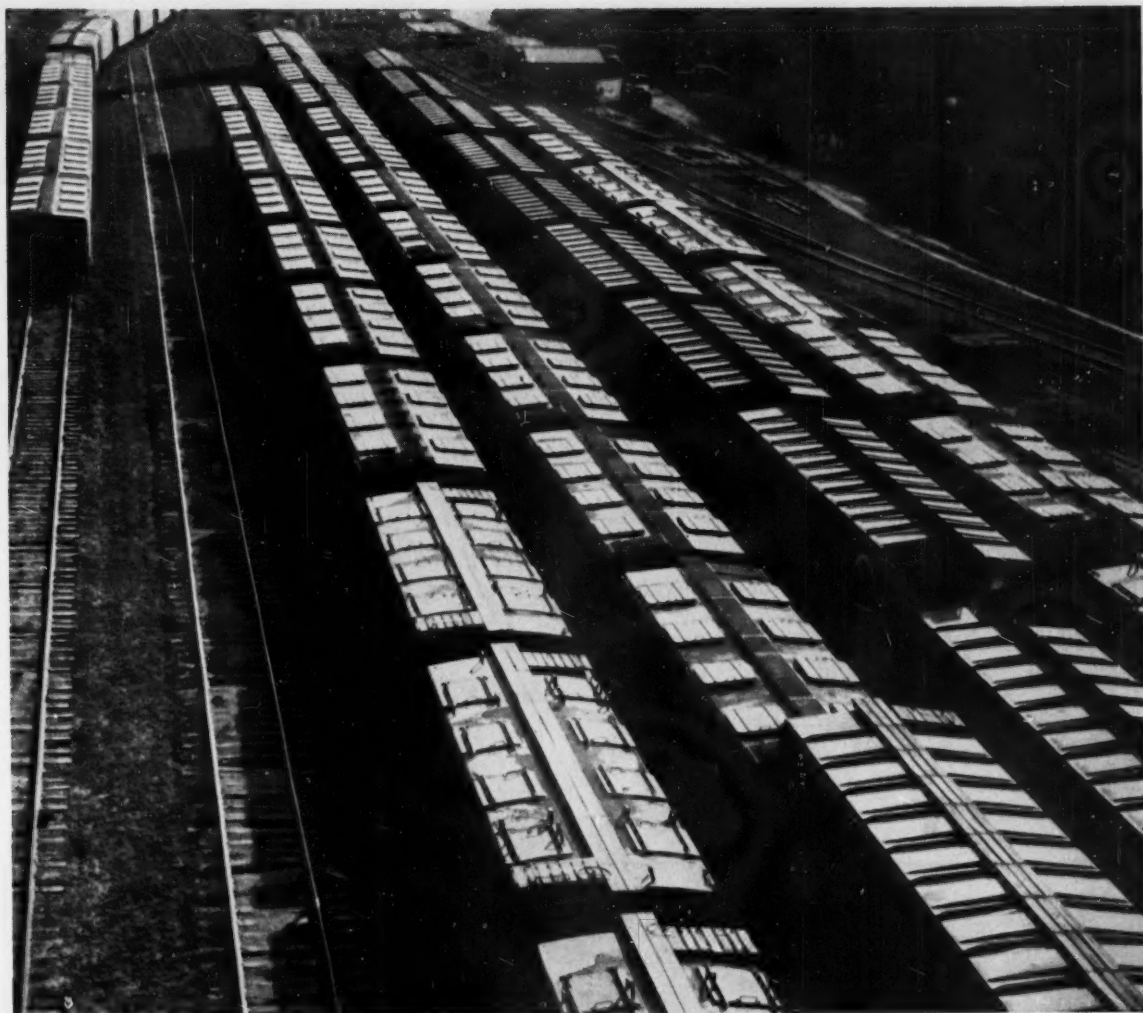
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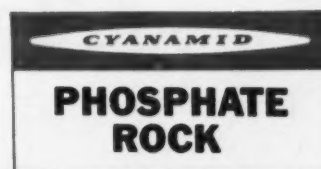
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when you need it...as you need it

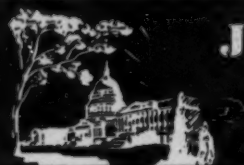
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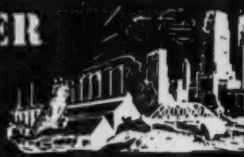
**Why not call us today?** American Cyanamid Company, Agricultural Division, 30 Rockefeller Plaza, N. Y. 20, N. Y.





## JUST AROUND THE CORNER

By Vernon Mount



IF PEACE BREAKS OUT it could do the damage to the economy that was suggested by the Stock Exchange drop last month. The cancellation of defense contracts would be a severe blow to industry, if it came all at once — there's no doubt about that.

BUT HOW CAN IT? Here are two very large nations, each with almost unlimited resources in raw materials and in manpower. Here are two completely opposite ideologies. Here is the need to be ready, no matter what might cause the USSR to attack.

KHRUSCHEV'S VISIT, and Ike's return visit, can smooth things for a while. But a Dictator needs an enemy to keep his people with their noses to the grindstone. And we are it because we are big and powerful.

LET'S HOPE, however, that the people of the US will be as courteous to Mr. K as the Russians were to Nixon. A serious incident could set us back years, and might even be the match to touch off World War III, and perhaps the annihilation of our entire civilization. It could happen. DO WHAT YOU CAN to make sure it doesn't happen.

Yours faithfully,

*Vernon Mount*

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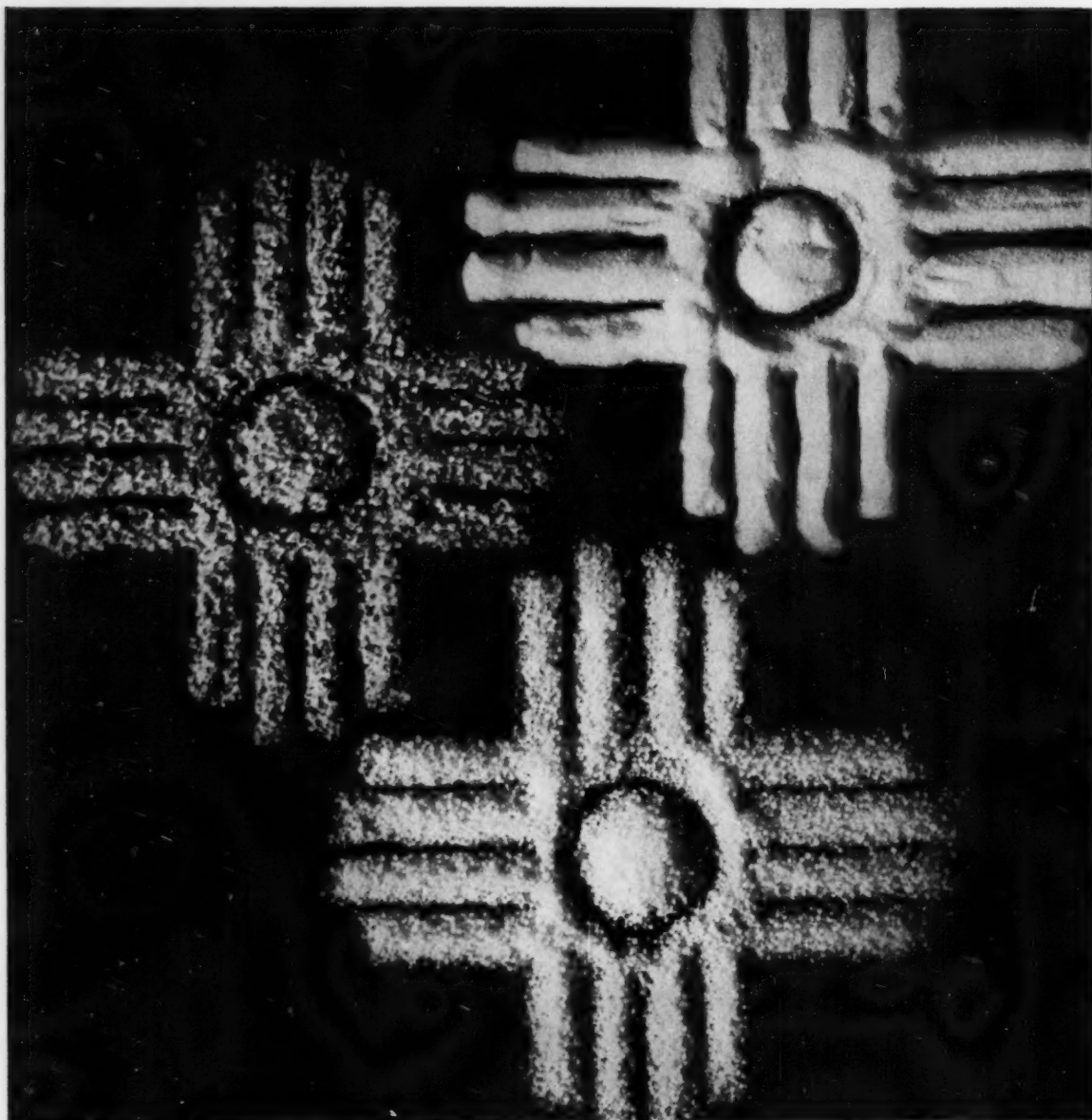


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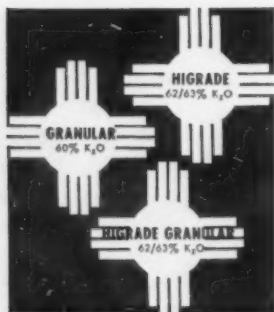
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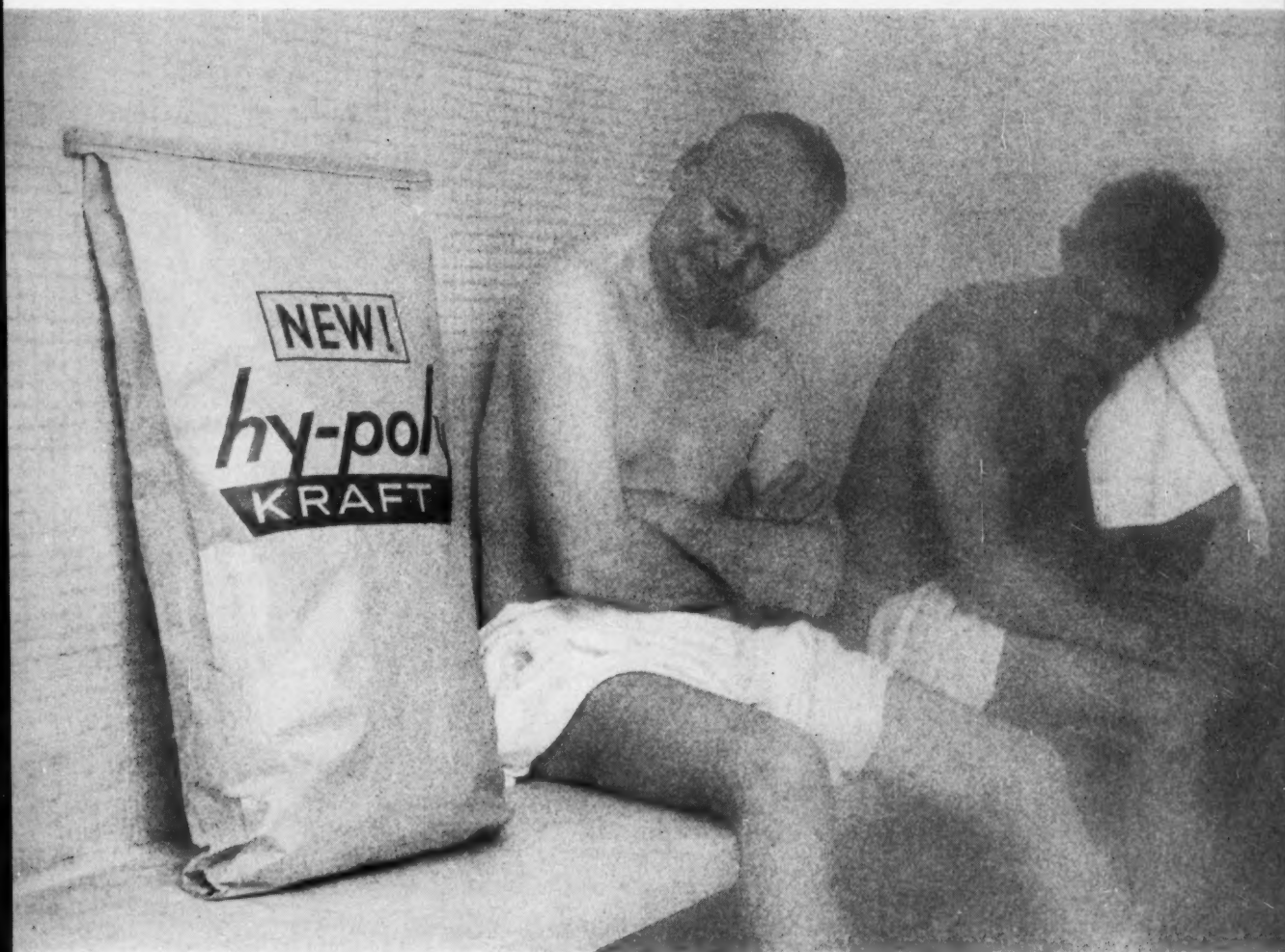
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We steamed this new Bagpak® multiwall in 95% relative humidity at 120° F. for 48 hours. (Unprotected, under these conditions, this chemical takes on 2 ½ times its weight in water in about an hour!)

But when we opened up the bag, the thirsty crystals spilled out as though they had been stored on the Sahara!

And Bagpak's new Hy-poly kraft *saves you money*. You stand to save from \$5 to \$16 per thousand multiwalls!

That's because new Hy-poly kraft is so superior to medium and low-density PE sheets that you get equal, if not greater, moisture-vapor protection from a coating approximately *half as thick!*

Extensive laboratory tests prove that this dramatic new barrier sheet is superior in *every way*. Write us today for samples.



See how calcium chloride protected by Hy-poly kraft Bagpak, pours after 48-hour steam bath!

Bagpak Division **INTERNATIONAL PAPER** New York 17, N. Y.

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and extra profit! Lion E-2 is free-flowing  
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**EASY-TO-HANDLE BAGS.** Lion E-2 multiwall bags are specially coated with Monsanto Syton®—the antislip agent that lets you stack Lion E-2 higher... move it faster... handle it easier. It helps you save time, work and space... reduces material losses through breakage due to slippage.



**TAKES LESS STORAGE SPACE.** Lion E-2 has the greatest density of any ammonium nitrate on the market. It's less bulky... takes 20% to 25% less storage space. It saves you needed floor area. It isn't necessary to spread out E-2 in smaller stacks. With E-2 you stack higher utilizing all available storage area, without fear of caking. You can safely stack E-2 higher.

**MONSANTO CHEMICAL CO.**  
Inorganic Chemicals Division  
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**NEW LION E-2**

***Always stores...***

***Always pours***



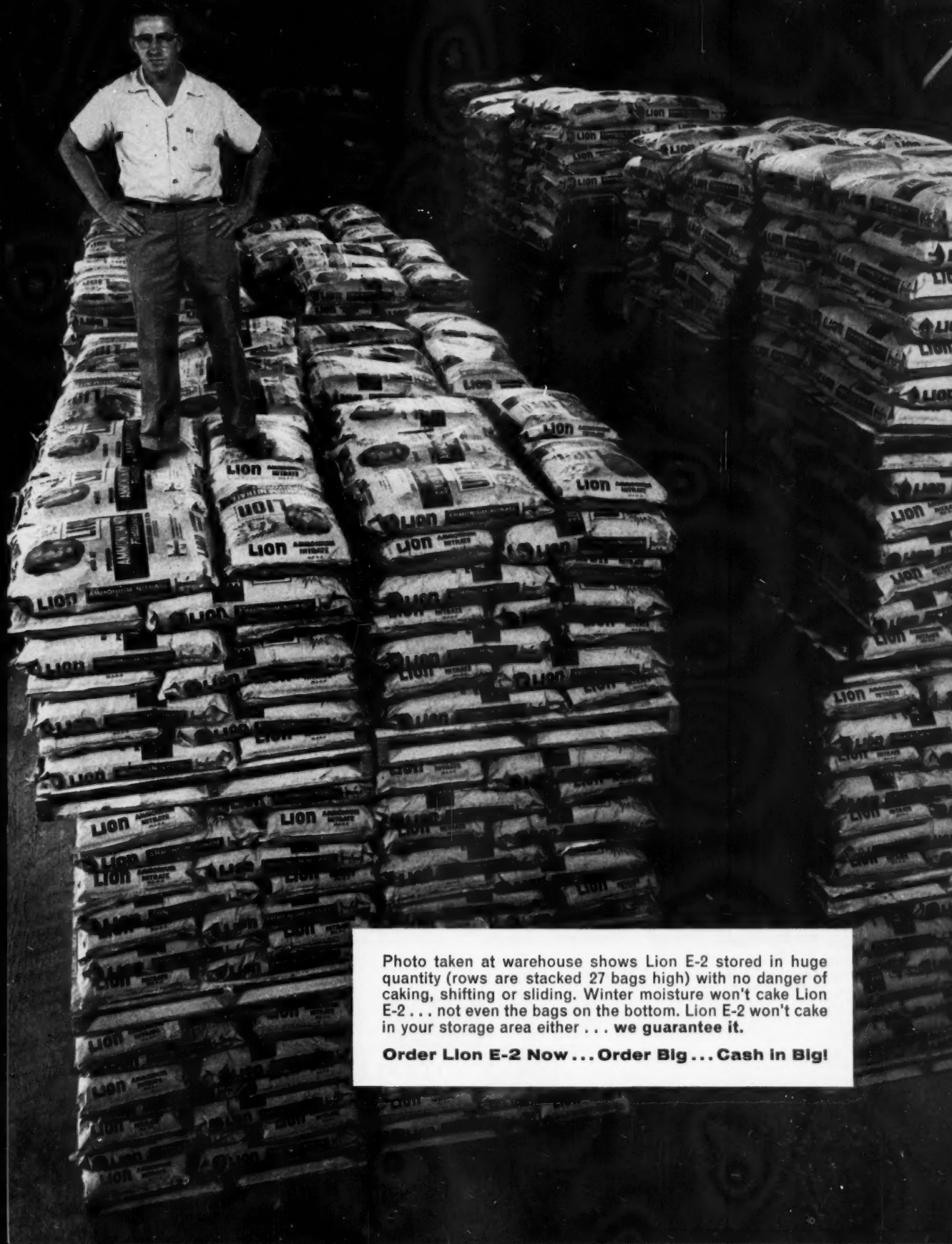


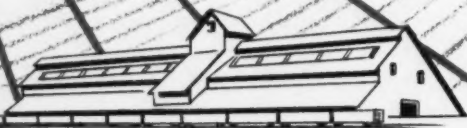
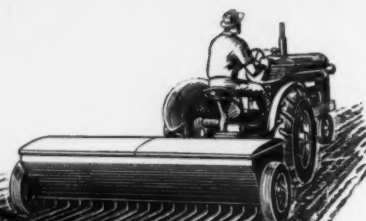
Photo taken at warehouse shows Lion E-2 stored in huge quantity (rows are stacked 27 bags high) with no danger of caking, shifting or sliding. Winter moisture won't cake Lion E-2 . . . not even the bags on the bottom. Lion E-2 won't cake in your storage area either . . . we guarantee it.

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# Arcadian® News

Volume 4

For Manufacturers of Mixed Fertilizers

Number 9

## Record Crops This Year Indicate Good Fertilizer Market for 1960

**Record cotton and corn crops** plus continued high farm productivity in general are promising indications of another good fertilizer year in 1960.

Latest official crop forecasts from Washington predict the highest cotton crop in history, more than 14,800,000 bales. That's a resounding 29% increase over last year's crop. More significant, with yield prospects good to excellent in all states, the indicated per acre cotton yield is 474 pounds. That tops the past 10-year average by 145 pounds. Production records like this set plant food removal records too.

Based on known plant food requirements, this year's anticipated cotton production represents a calculated soil fertility drain of 296,300 tons of Nitrogen, 148,150 tons of  $P_2O_5$  and 98,742 tons of  $K_2O$ . (*This is the plant food removed by lint and seed, not including that required by stalks, leaves and burrs.*)

To maintain their high rate of production, farmers will need large supplies of mixed fertilizer next year.

Cotton this year is being grown under a new Federal program designed to open up broader markets by lowering price supports to growers. The program permitted growers to expand acreage, and they did, increasing cotton land from 11,849,000 acres harvested last year to nearly 15,000,000 acres this year. Most of this acreage had been in the Soil Bank during 1958.

Observers in Washington believe there will be no major farm legislation to change the government's cotton program

### ESTIMATED PLANT FOOD REMOVAL BY MAJOR CROPS IN 1959

(Based on latest forecast production figures, August 1, 1959)

	Tons of N	Tons of $P_2O_5$	Tons of $K_2O$
<b>CORN</b> (4,173,470,000 bu.)	1,878,061	730,190	521,502
<b>COTTON</b> (14,815,000 bales)	296,300	148,150	98,742
<b>WHEAT</b> (1,118,960,000 bu.)	699,350	349,670	209,800

Plant food removal is calculated: on CORN for grain alone not including stover; on COTTON for lint and seed, not including stalks, leaves and burrs; on WHEAT for grain, not including straw.

between now and the next crop season. With expanded acreage and farmers aiming at increased yields too, the cotton belt fertilizer market looks promising.

Recent forecasts from the corn country indicate a tall crop of 4,173,470,000 bushels this year that stands 10% above last year's record production. Although yield per acre is slightly lower, removal of acreage allotments in commercial areas resulted in a 14% increase in corn acreage this season.

### Huge Need for Fertilizer

This tremendous corn crop will take a fantastic amount of plant nutrients from the soil. Figuring from known plant food requirements for grain alone (excluding stover), removal of this much grain adds up to a calculated soil fertility drain of 1,878,061 tons of Nitrogen,

730,190 tons of  $P_2O_5$  and 521,502 tons of  $K_2O$ .

Replacing that plant food for continued high production of corn offers a challenging fertilizer sales goal.

Although wheat and other grains showed lower prospects for yields and production this year, these crops still present a continued need for quality mixed fertilizers.

Looking at estimated total crop production, officials report the prospects are edging within 3% of last year's outstanding record. Among the leaders besides cotton and corn, sugar beets, dry peas, soybeans, dry beans and rice are running higher or equal to previous record production.

U.S.D.A. agricultural scientists at Beltsville, Maryland, recently reviewed the subject of plant food removal from

(Continued on following page)



(Continued from preceding page)

the soil. Looking at 1958 harvests, the scientists gave this priority to plant nutrient replacement in the soil: nitrogen, first; potash, second; and phosphorus, third.

As modern farmers strive for continually higher yields per acre, fertilizer is their best bargain. Surveys of rising farm production costs have indicated

that fertilizer remains one of the best investments farmers can make. Fertilizer puts growing power into each acre and farmers know it.

Farm income in general is good this year, although it has dropped somewhat from last year's high level. However, buying power for the tools of high production is strong. After this season's heavy plant food removal, fertilizer will

be needed to maintain production and farm income.

Farm advisors, county agents and other agricultural specialists have been advocating increased use of fertilizer to boost yields and cut costs of production. That fact of economics, combined with the plant food reduction in this big crop season, can lead to bigger sales for fertilizer in 1960.

## TONNAGE OPPORTUNITIES

# SELL MORE FERTILIZER THIS FALL!

**1958-59** was a big tonnage year for fertilizers. The best way to make 59-60 surpass it in sales is to sell more fertilizer this fall, ahead of the spring rush. Many farmers are good prospects for fall buying—if we get out and sell them. And, more than anything else, the fertilizer industry needs to expand its delivery seasons to take the pressure off spring production and shipping. Also, remember that fall discounts on ammoniating solutions and potash offer you better profit possibilities on mixed goods made and sold this fall than on those produced next spring. *Now is the time for action!*

### More Farmers Use Fall Fertilizers

Leading farmers in many areas have been using more and more fertilizer in the fall. And they are seeing the advantages of fall application in: use of slack season labor, longer pasture seasons, better crop yields and reduced winter-kill of grain and hay stands.

The soil is a more economical place to store fertilizer over the winter than a barn or a dealer's warehouse. Fall-applied fertilizers have given excellent results on sod crops throughout the U.S. Fall plowdown of fertilizers has proved

practical except on light sandy soils or in areas where winters are mild and humid.

Our long-accepted fall markets for fertilizer are expanding along with newly-accepted practices. Many stands of alfalfa and other legumes were winter-killed in the North last year. Farmers are anxious to do better this winter. Fall application of mixed fertilizer helps maintain thick, long-lived legume stands. Meadows, where legumes have run out, need high-nitrogen mixed fertilizers.

Fruit crops, too, can be fertilized in the late fall. Fall vegetables are another good market, and many growers like to apply fertilizer to cover crops in the autumn.

The burning of small-grain straw and stubble has almost disappeared, as farmers have found that plow-down of fertilizer with this organic matter improves the soil and helps build bigger yields of succeeding crops. When you work to build this plow-down market, you can also emphasize the value of fertilizer in the grain drill at planting time. This helps even late-planted fields to come up to a good stand that will live through the winter to produce a good crop.

Many farmers, as well as experiment stations, in the North have proved that grass haylands and pastures need fertilizer before fall freeze-up to strengthen the roots for earlier, heavier spring growth. Oats, wheat, clover and other grazing crops in the South need heavy fall fertilization to produce extra forage as well as a profitable grain crop. Thousands of acres of Coastal and Midland Bermuda grass that produce large tonages of feed in the warm months use huge amounts of plant food. Winter grazing crops, inter-seeded in such sod, are especially in need of heavy fertilizer application.

### Fall Plow-Down

Cotton planters like to chop their stalks after harvest in early fall, to reduce insect carryover, and in heavy soil areas they may also plow out the old beds. Fall application of mixed fertilizer is an efficient way to get ready for the next crop, to help improve insect control, and to build extra growth of winter cover crops.

Corn land is one of the biggest fall fertilizer markets. Plow-down of fertilizer

with corn stalks and stubble is a soil and yield builder. This practice also works well for other heavy-feeding crops, such as sorghum and sugar beets.

Soil compaction by heavy equipment is one problem farmers avoid by fall spreading of fertilizer before plowing. Fall, with its dry ground, is the ideal time to spread fertilizer by truck or heavy tractor, without excessive soil compaction on sod or on land to be plowed.

Be sure your salesmen and dealers are acquainted with the fall fertilizer opportunities in their respective areas. Information on crop yields and photographs showing results of fall-applied fertilizers in previous years can be very helpful to your salesmen in developing more fall business this year. If varying soil textures are a problem, you will want to equip your men with soil maps indicating specific areas which are suitable for fall fertilizer application.

#### Fall Use Means Liberal Use

Fall fertilization favors liberal fertilizer application. Modern farming calls for a lot more plant food than a few hundred pounds per acre in the drill or planter. Top-dressing or plow-down in the fall makes heavy fertilizer use easy. It pays producers to do all they can to favor these two important trends.

Take a look at the map of your sales area. Before you finish counting all the acres of corn, small grains, meadows, pastures, vegetables and fruit that could benefit from fall fertilization, you'll probably stop figuring and get right out and start selling!



## 2-1-1 vs 1-1-1 for Grass

Only a few years ago, typical pasture fertilizers contained little or no nitrogen, and these fertilizers were often supplemented with nitrogen top-dressing. Then 1-1-1 ratios, such as 12-12-12 and 10-10-10, became popular and produced outstanding results. Today, there is a trend to higher nitrogen mixed fertilizers for pastures. Farmers and fertilizer men are finding that they make more money from 2-1-1 ratios, such as 16-8-8 fertilizer for grass.

A 2-1-1 ratio of nitrogen, phosphoric

acid and potash does a far better job of meeting the exact plant food needs of grass than a 1-1-1 ratio. On fields that have been neglected, it may be advisable to use a 1-1-1 ratio for a year or two to build up soil supplies of plant foods. But this should be followed with regular use of a 2-1-1 ratio to supply fertilizer nutrients in the approximate ratio in which they are removed by grass for grazing and hay.

In Wisconsin, for example, where many pasture demonstrations have been fertilized with 16-8-8, the net profit per acre from increased forage yields has been exceptional. As a result, wherever fertilizer dealers sell 16-8-8, sales have been much larger than expected.

Complete pasture fertilizer, well-balanced with plenty of nitrogen (such as 16-8-8), produces better returns than a heavy application of 0-1-1 fertilizer followed later by nitrogen top-dressing. Experiments show that a heavy application of straight potash causes pasture plants to take up more of this element than is necessary for high yields. When nitrogen is applied with phosphorus and potash in a mixed fertilizer, the crop uses all of these nutrients more efficiently.

The fall is a good time to apply 16-8-8, and fall fertilization is one of the best ways to insure a much longer grazing season. In the cool weather of late fall and early spring, soil bacteria that provide available nitrogen from the soil become dormant at a much higher temperature than that at which grass becomes dormant. Grass needs plenty of nitrogen in the fall and early spring. For extra profits for you and the farmer, sell 16-8-8 fertilizer for pastures now!



#### AVERAGE RESULTS WITH 11 DEMONSTRATION PASTURE PLOTS, 1958

Fertilizer per acre	Yield per acre dry weight	Increase in yield	Value of increase	Cost of Fertilizer	Extra profit per acre
500 lbs. 16-8-8	8,388 lbs.	4,728 lbs.	\$118.20	\$21.50	\$96.70
No fertilizer	3,660 lbs.				

(From Prof. C. J. Chapman, University of Wisconsin)

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	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. in. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
<b>NITRANA®</b>									
<b>2</b>	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
<b>2M</b>	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
<b>3</b>	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
<b>3M</b>	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
<b>3MC</b>	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
<b>4</b>	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
<b>4M</b>	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
<b>6</b>	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
<b>7</b>	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
<b>URANA®</b>									
<b>6C</b>	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
<b>6M</b>	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
<b>10</b>	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
<b>11</b>	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
<b>12</b>	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	-7
<b>13</b>	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
<b>15</b>	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
<b>U-A-S®</b>									
<b>A</b>	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
<b>B</b>	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
<b>Anhydrous Ammonia</b>	82.2	99.9	—	—	—	24.3	0.618	211	-108

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# Status of

## LIQUID MIXED FERTILIZER

### Technology

by A. V. SLACK

Applied Research Branch

Tennessee Valley Authority

The liquid mixed fertilizer industry, which had its beginnings in the Far West, has now spread to all parts of the country and in some areas accounts for a significant portion of fertilizer consumption. The growth has been affected to some extent by problems peculiar to liquid forms of fertilizer. Progress is being made toward solving or minimizing these problems and thereby gaining full benefit from the inherent advantages of the liquid form. The purpose of this paper is to review progress on the problems and to summarize the general status of liquid fertilizer technology. Since a review on the subject was published in 1957 (5), this paper is restricted mainly to developments in the past 2 years.

#### Growth in Production

The 1957 review gave 167 as the approximate number of liquid mix plants in this country; today there appear to be more than 300. The approximate location of these plants is shown in Figure 1. While all available sources of information were used in making up this map, several plants probably have been omitted or entered incorrectly. In such a fast-growing industry it is difficult to get complete information on the current situation.

Current production is even more difficult to estimate. Several plants are operating at an annual production rate of more than 5,000 tons, but the average is considerably lower than that, probably in the 1,500- to 2,500-ton range. On this basis, production this year would be in the range of 450,000 to 750,000 tons. An estimate made on a different basis—estimated amount of raw materials going into liquid mixed fertilizer production—gives a figure of 500,000 tons for 1958. These values indicate that 3 to 5 per cent of the mixed fertilizer being produced currently is in the liquid form.

#### Plant Equipment

The preferred type of plant appears to be the semicontinuous type, that is, phosphoric acid and ammonia (or solution containing free ammonia) are fed concurrently to a reaction vessel to make up a batch of solution. Minor adjustment of composition can be made after all the constituents are added. The reaction vessel is usually a small stainless steel chamber or pipe section, from which the neutralized solution flows into a mild steel batch tank. In some instances the reaction chamber is placed inside the batch through a cooler and through the reaction chamber is common practice.

Another type of plant which is growing in popularity is a simple blending, or "cold mixing," type. No reaction vessel is required, since the phosphatic raw material used is purchased in a neutralized form. The main items of equipment needed are meters, feeders, and a mixing tank. One of the main problems in operating this type of plant is the cooling effect resulting from dissolution of salts. There is no heat of reaction to offset this as there is in neutralization plants. As a result cooling of the solution may slow

down dissolution of salts to the point that production rate is seriously reduced. Dissolution rates for some grades and combinations of raw materials have been measured at TVA (4).

Mild steel is generally accepted as the construction material for all equipment except the reaction chamber and acid-handling equipment. The main trouble with mild steel appears to be rusting in storage and application equipment, with consequent stoppage difficulty in application. Aluminum equipment is used by some, especially when ammoniating solutions are also handled, but the consensus seems to be that aluminum should be avoided in the handling of liquid mixes. Corrosion of various metals in liquid fertilizers has been studied at TVA (1).

#### Raw Materials

Furnace-type phosphoric acid is still the main source of phosphate, although wet-process acid is being used in a few plants. Cold-mixing plants, which are few in number, use ammonium phosphate solution or solid diammonium phosphate.

Urea-ammonium nitrate solution appears to be the principal source

Figure 1. Approximate Location of Liquid Mixed Fertilizer Plants in the U. S. in 1959



tinues to be a leading source of supplemental nitrogen.

Practically all the potash is supplied as potassium chloride. However, limited use of potassium hydroxide has been noted recently, mainly to reduce the chloride content in tobacco fertilizers.

Supplies of all raw materials seem adequate with the exception of phosphoric acid. It is reported that the supply of both furnace and wet-process acid has been limited during the current production season, especially in the Midwest. The acid is in such demand in the solid fertilizer industry for use in granulation that production and shipping facilities have not been adequate to meet the needs of all consumers.

### Grade Limitations

A continuing problem is the relatively low analysis attainable in liquid mixes as compared to solid mixes. Coupled with this is the lack of good data on what grades can be made with available materials.

Considerable progress has been made on the latter problem. Work has been done by the Monsanto Chemical Company and Sohio Chemical Company in determining the solubility of specific grades or nutrient ratios (3, 7). The Sohio work also included a study of the effect on solubility resulting from varying the ratio of urea to ammonium nitrate in the supplemental nitrogen. In work at TVA, a method has been worked out whereby the maximum grade stable at 32° F. can be estimated for any nutrient ratio (6). Also, by use of a formula developed in this work salting out temperature for particular grades can be estimated.

Although progress has been made, more data are needed on solubility in liquid mixed fertilizer systems. Some information is available on solutions made with diammonium phosphate (4) or from superphosphoric acid (8) but more is needed. Little or no information has been available on solutions in which part or all of the potassium chloride is replaced with potassium hydroxide. Liquid fertilizers of this type are being studied at TVA.

Progress is also being made toward increasing the nutrient content of liquid mixed fertilizers. The various approaches and the status of each are summarized as follows: 1. Urea has been regarded as the best source of supplemental nitrogen as far as solubility is concerned. Work by Sohio Chemical Company (7) has shown that use of ammon-

ium nitrate along with the urea raises the grade for some nutrient ratios. The optimum amount varies with the ratio. In many instances, however, addition of ammonium nitrate reduces solubility.

2. The  $\text{NH}_3:\text{H}_3\text{PO}_4$  ratio has a significant effect on solubility in grades low in potash. General practice is to use a mole ratio of 1.7, whereas 1.6 or 1.5 usually gives a somewhat higher grade. A few producers are taking advantage of this.

3. Use of superphosphoric acid (76%  $\text{P}_2\text{O}_5$ ) gives a large increase in solubility, especially in grades low in potash (8). Several producers are using superphosphoric acid this season. An 11-33-0 base solution made from superphosphoric acid is also being used to some extent in cold-mix operations.

4. For grades containing potash, solubility can be increased by using potassium hydroxide or potassium carbonate rather than potassium chloride. However, these materials are so much more costly than potassium chloride that use of them merely to increase concentration is quite limited.

5. Concentration can be increased by exceeding the solubility of the nutrient salts and treating the salted out constituents to produce a stable suspension. Salting out is then no longer a major difficulty but problems in applying the product are introduced. Very high grades can be produced in this manner but much more work is needed before the practicality of the method is established and producers can use it with any assurance of success. However, successful production and application of a salt suspension has been reported.

In addition to the problem of limited concentration, liquid fertilizer producers are not able to make some of the popular nutrient ratios because of their high acidity. Examples of these are 1:4:4, 1:6:6, 1:4:2, and 0:1:1. Such ratios can be made by replacing part or all of the potassium chloride with potassium hydroxide. The salting out temperatures of grades prepared in this way have been studied at TVA.

Special grades also give trouble in liquid fertilizer production. Tobacco grades, for example, require use of nonchloride potash in the formulation. Potassium hydroxide is useful for this purpose in liquid fertilizers since it gives higher solubility than does the potassium sulfate ordinarily used in solid fertilizers. Solubilities for this system have also been determined at TVA.

Use of potassium hydroxide in tobacco fertilizers has been reported.

Some fertilizers contain insoluble constituents such as magnesium compounds or water-insoluble nitrogen. The suspension technique has been found useful for preparing such fertilizers in fluid form.

### Process Economics

**Equipment Cost:** One of the main advantages of the liquid route to fertilizer production is the relatively low investment required for plant equipment. Elimination of operations such as granulation, curing, fume disposal, and bagging simplifies production considerably. However, many producers have found it necessary to invest heavily in distribution and application equipment in order to sell their product. Thus the total investment can be considerable—reportedly over \$200,000 in some instances. This problem is minimized as farmers obtain their own application equipment or custom applicators set up to do business in an area.

**Raw Material Cost:** The liquid fertilizer producer is usually in good position as far as costs for operating labor, maintenance, and depreciation are concerned. However, raw material cost is an important problem.

The trend is to use of urea—ammonium nitrate solution rather than urea as a means of reducing cost for supplemental nitrogen, even though the grade is usually lowered thereby. The main raw material cost problem, however, is in regard to phosphate. The lower cost of wet-process acid in most areas has led to a major effort in finding ways to use it. The various efforts to avoid the problem brought about by the impurities in wet-process acid can be grouped under the following headings.

1. Purifying of acid. The problem can be minimized by giving some attention to the purity of the acid at the producing point. Some producers now do this, either by extended settling or by chemical additions to precipitate some impurities. However, the major impurities—iron and aluminum—are not removed by these procedures.

2. Precipitation of impurities. The iron and aluminum precipitate upon ammoniation of the acid and can then be removed by filtering, decantation, or other separation methods. The precipitate, however, contains part of the phosphate and must be recovered and used. For a producer making only liquid



mixed fertilizer this is a difficult problem. For this reason the method is more applicable to plants that also produce a solid NP or NPK fertilizer, into which the settled sludge or filter cake from the acid ammoniation step can be incorporated.

This method is in use, mainly in the Pacific Northwest. There most of the liquid mixers use a base 8-24-0 solution supplied by an acid producer. Except for shipping cost, this appears to be a good way of using wet-process acid in liquid mixed fertilizers.

3. Sequestration of impurities. Since the producer of liquid mixes normally has no good way to handle separated impurities, he must leave them in and try to find some way to get an acceptable product. One approach is to add a sequestering agent that will prevent the impurities from precipitating when the acid is ammoniated. There are several agents which will do this but most of them are too expensive. The only one that appears promising is superphosphoric acid; the pyrophosphoric and polyphosphoric acid it contains will sequester impurities as well as supply phosphate to the solution. Work on this method is being carried out by TVA and by several producers.

4. Suspension of impurities. A simple and attractive approach is to allow the impurities to precipitate and suspend them in such a way as to give satisfactory handling and application properties. Considerable work has been done on this method, also, by TVA and by various producers and raw material suppliers. Conditions during the ammoniation step affect the properties of the suspension, and a suspending agent such as a clay has been found helpful in some instances. Some use of wet-process acid by suspending impurities has been reported.

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## SALT SUSPENSION

### Fertilizers

by H. K. WALTERS, JR.  
Applied Research Branch  
Tennessee Valley Authority

Preliminary work has been carried out at TVA on increasing the grade of liquid fertilizers by carrying nutrient salts in suspension. The products are made in the usual way but the amount of water is reduced so that salting out occurs on cooling. The crystallized salts are kept in suspension by use of a suspending agent or other means for producing a stable suspension.

In small-scale tests clay was found to be an effective suspending agent. Only a small amount was required. Two types of clay were tested, a bentonite and an attapulgite. To get the maximum suspending effect, it was necessary to disperse the clay thoroughly before adding it to the liquid fertilizer. The clay was mixed with water in a ratio of 1:9 parts by weight and the mix subjected to a shearing mixing action by pumping through a gear pump. The resulting "master batch" was then used to supply clay to the liquid fertilizer.

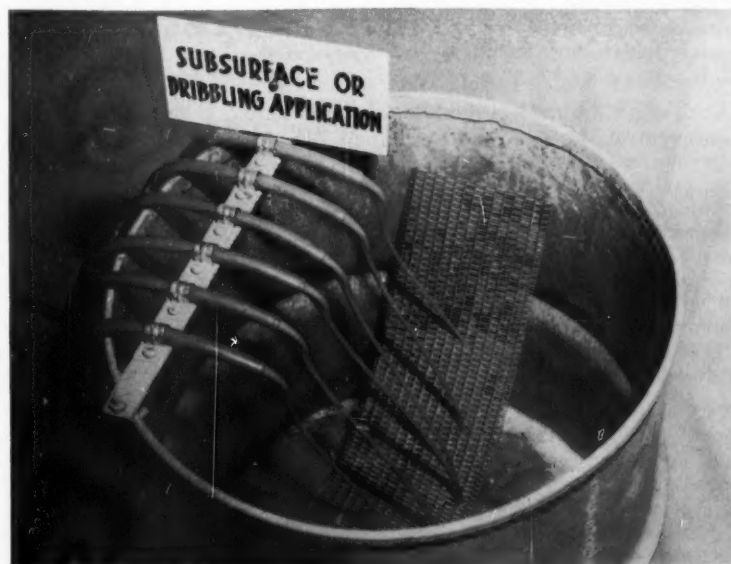
The clay additive not only stabilizes the suspension and minimizes settling, but also has an in-

hibiting effect on growth of the salt crystals in suspension. Presumably the clay furnishes a large number of nucleation sites, thereby increasing the number of crystals and reducing the average crystal size. The increase in viscosity resulting from the clay addition probably also slows down crystal growth.

Several suspensions containing clay have been made in bench-scale tests from both furnace phosphoric acid and wet-process phosphoric acid. A stepwise neutralization procedure was used, i.e., all the acid was added to the reactor before neutralization was started. The amount of clay used was 1 per cent by weight of the total suspension. After storage for a week at 32° F., the products were pumped with a "squeeze" type pump through a nozzle (6/64-in. diameter). Grades such as 5-15-15 and 14-14-14 made from furnace acid pumped satisfactorily, as did a 14-14-14 made from wet-process acid. Supplemental nitrogen for the 14-14-14 products was from urea.

Because of the impurities present in wet-process acid, it behaves somewhat differently from furnace acid in salt suspensions. There is some indication that the precipitated im-

Dribble-pumping of salt suspension fertilizers as demonstrated at TVA pilot plant. Hose-and-reel pump was used to propel liquid.



purities have a suspending effect on nutrient salt crystals, especially if the pH is kept high during neutralization.

The work described above was preliminary in nature. Although the products appeared satisfactory in small-scale tests, several factors have not been investigated that might have a bearing on distribution in field application equipment. Work on these is in progress. Emphasis is being placed on wet-process acid in this study.

There appears to be no commercial production of salt suspensions at present. A few trial runs have been successful, but no continuing production has been reported.



Liquid fertilizer pumping apparatus in pilot plant at TVA. Rig at left is pumping 8-24-0 solution; equipment at right is that used for pumping operation pictured on page 25.

## LIQUID FERTILIZERS

### *from Caustic Potash and Superphosphoric Acid*

by J. M. Potts

Applied Research Branch,  
Tennessee Valley Authority

A factor which is likely to hinder gain in popularity of liquid fertilizers is the relatively low nutrient content which results from limited solubility of raw materials. Increased solubility has been obtained by substituting superphosphoric acid for orthophosphoric acid. Further increases may be obtained by substituting potassium hydroxide for potassium chloride.

A drawback to the use of potassium hydroxide in liquid fertilizers is its relatively high cost. However, it appears that there may be special situations, especially for crops which need low-chlorine fertilizers, where the use of potassium hydroxide is justified economically. Potassium sulfate, which is commonly used in low-chlorine solid fertilizers, is not sufficiently soluble for use in liquid fertilizers.

TVA is carrying out an experimental study of liquid fertilizers based on superphosphoric acid and potassium hydroxide. Emphasis is being placed on tobacco grades and on ratios such as 0-1-1 and 1-4-4 which do not contain enough nitro-

gen as ammonia to neutralize the acid present and would therefore be acidic without the use of potassium hydroxide.

Use of potassium hydroxide instead of potassium chloride made possible the production of liquids of higher grades of the same  $N:P_2O_5:K_2O$  ratio and lowered the saturation temperatures for the same grades. Maximum grades which did not salt out at 32° F. were 7-14-14, 6-12-18, 6-12-15, 6-18-18, 5-20-20, 0-23-23, and 0-27-36 at the respective ratios of 1:2:2, 1:2:3, 2:4:5, 1:3:3, 1:4:4, 0:1:1, and 0:3:4. The maximum corresponding grades made with potassium chloride are 5-10-10, 3-6-9, and 3-9-9, respectively, for ratios of 1:2:2, 1:2:3, and 1:3:3. For the latter two ratios, nutrient content was doubled by using potassium hydroxide rather than potassium chloride.

The saturation temperature of a 5-10-10 grade solution made with half of the potash from potassium hydroxide and half from potassium chloride was 7° F. A 5-10-15 grade solution made similarly with one-third of the potash from potassium chloride had a saturation temperature of 0° F.

Tests in a 5-gallon reactor in which 0-21-21 and 6-12-18 grade liquid fertilizers were produced for

field tests indicated that neutralization of superphosphoric acid with potassium hydroxide is similar to neutralization with ammonia and can be carried out without any particular difficulty.

In making these solutions, superphosphoric acid and potassium hydroxide solution (45%) were added simultaneously to the reactor. The solution was recycled during the neutralization. The tests generally were run for periods of 20 to 30 minutes at a production rate of 10 to 15 gallons per hour.

Work is continuing on determination of solubility for other nutrient ratios and identification of the salts which crystallize when solubility is exceeded. Most of this work is with mixtures of potassium hydroxide and potassium chloride. By using the minimum amount of potassium hydroxide allowable for a particular grade the formulation cost is minimized.

Potassium hydroxide is being used with superphosphoric acid in at least one plant, and probably is being used with orthophosphoric acid in a few others. Some use of byproduct potassium carbonate as a means of reducing formulation cost has been reported. The potassium carbonate should give the same solubilities as obtained with potassium hydroxide.

The three papers by Messrs. Slack, Walters and Potts appearing on pages 23, 24, 25 and 26 were presented at the Liquid Fertilizer Conference sponsored by Tennessee Valley Authority's Division of Chemical Development at Wilson Dam, Alabama June 16.

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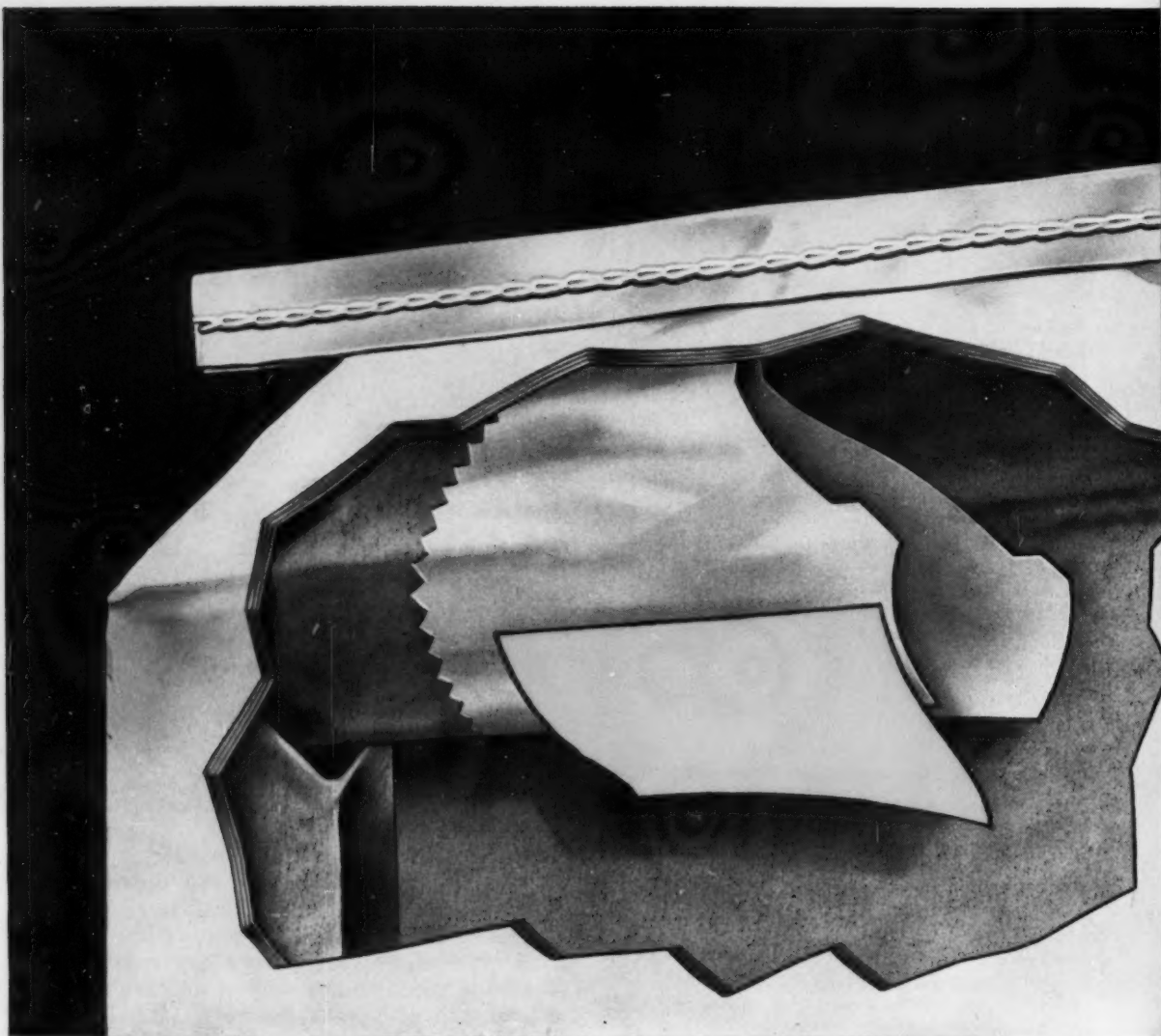
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proved their superiority over other sleeve valve bags for a wide variety of products—granular, pelletized or pulverized.

Try the Bemis "DUETTE." You'll be delighted with the results.

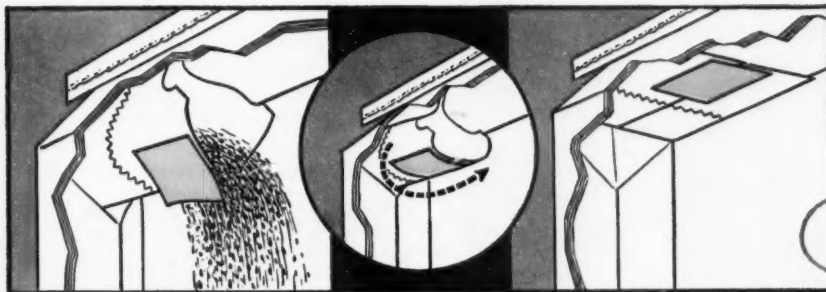
Write us for the *complete* story, or ask your Bemis Man. Samples on request.



**IT'S ABSOLUTELY  
NEW AND DIFFERENT!**

**The Bemis  
"Duette"**  
TRADEMARK

**multiwall sleeve valve**



**WON'T CLOG . . .** This view shows how the Magic Yellow check flap falls freely aside from the valve slit, giving no interference whatever to proper operation of the packing spout. The sleeve won't choke or clog the packer.

**POSITIVE CLOSING ACTION . . .** This diagrammatic picture shows action as the flap starts to close over the valve slit.

**CAN'T SIFT . . .** When the bag is filled, the Magic Yellow flap, acting as a check valve, completely overlaps and covers the valve slit, keeping the product from reaching the place where it might find a chance to sift.

**Bemis**



**GENERAL OFFICES**  
408 Pine Street, St. Louis 2, Missouri  
Sales Offices in Principal Cities



## ARIZONA

**Southwestern Nitrochemical Corp.** has broken ground at Chandler for the \$4,000,000 anhydrous ammonia plant jointly owned by the Southwestern Agrochemical Corp. and the First Mississippi Corp. L. Richie has been named plant superintendent.

## ARKANSAS

**War Eagle Lime Co. Inc.** has been incorporated at Huntsville by Robert Lee Yarbro, Hubert Ernest Yarbro and John E. Yarbro. Capital stock authorized—200 shares at \$5.

## CALIFORNIA

**Nutrilit Products**, Buena Park, has introduced Key Green, an essential trace mineral compound in phosphate form, according to their sales director, Robert Trescott. It is guaranteed to contain nitrogen in ammoniac form, phosphoric acid, iron, zinc and manganese, all chemically derived. Packaging is in 4 ounce and 1 pound plastic bags.

## IDAHO

**Central Fertilizers** plan to dedi-

cate their \$16,000,000 plant at Georgetown September 10. A special train from Denver will bring in the top brass and shareholders, and local officials are joining to make it a big day. 300 guests are expected, and will start the day off with a chuck wagon breakfast, and wind it up with an evening program.

## ILLINOIS

**U. S. Industrial Chemicals** has completed construction at Tuscola of an innovation in phosphoric acid storage tanks. This is a reinforced concrete structure which will hold more than a million gallons of phosphatic fertilizer solution. The tank was built for USI by the Preload Company, New York, and is one of the largest ever built for the purpose.

The big tank will do a job of smoothing out the demand curve for USI, and the mixing plants they serve, because it will increase their storage capacity by 45 days production, ensuring a steady supply at peak periods. It serves formulators in a 12 state area.

Howard Gilman, Executive V. P. and Treasurer of the Gilman Paper Company, announced the placing of a contract with the S. S. Jacobs Company of Jacksonville, Florida, who will erect this modern converting plant of approximately 300,000 sq. ft. in St. Marys, Georgia. The architects are Ketchum & Sharp, of New York. This new building will house under one roof the combined multiwall bag plants and other converting operations of the Kraft Bag Corporation, subsidiary of the Gilman Paper Company. This converting plant will receive its paper from the St. Marys Kraft Corporation, wholly-owned subsidiary of the Gilman Paper Company, a fully integrated operation, amply supplied by Company-owned woodlands in the vicinity of the mill, and adjacent to the newly developed Kings Bay Terminal, which is capable of handling ocean going vessels.



## U. OF. CAL. FINDS PHOSPHORITE IN SEA

Possibility of a new West Coast industry was suggested with the recent discovery of an undetermined amount of phosphorite deposits in the sea not far from San Diego, Calif.

A half ton of the mineral was dredged from the ocean bottom during a preliminary expedition headed by scientists from the University of California.

Dr. Herbert Hawks, professor of mineral exploration at the university, suggested the phosphorite could be the basis of a fertilizer industry if it could be produced in competition with phosphate from Idaho and Florida.

## IOWA

**Ris Van Inc.**, Belmond, is building a \$150,000 plant for production of liquid fertilizer at Sanborn. Capacity is rated at more than a thousand daily tons, and the plant should be on the line next month. The concern is already in production in other plants at Belmond and West Union, Iowa and Blue Earth, Minn. Kenneth Van Duzer is president.

## KANSAS

**Cooperative Farm Chemicals**, as we went to press, was expecting to open up September 1 with the 100 daily ton addition to their anhydrous ammonia plant at Lawrence—bringing them to 300 daily tons. As we reported here last month the project was in the hands of Chemical Construction Corp., as is the next project, a \$1,250,000 nitric acid plant with a capacity of 120 daily tons. They hope to complete this by January 1.

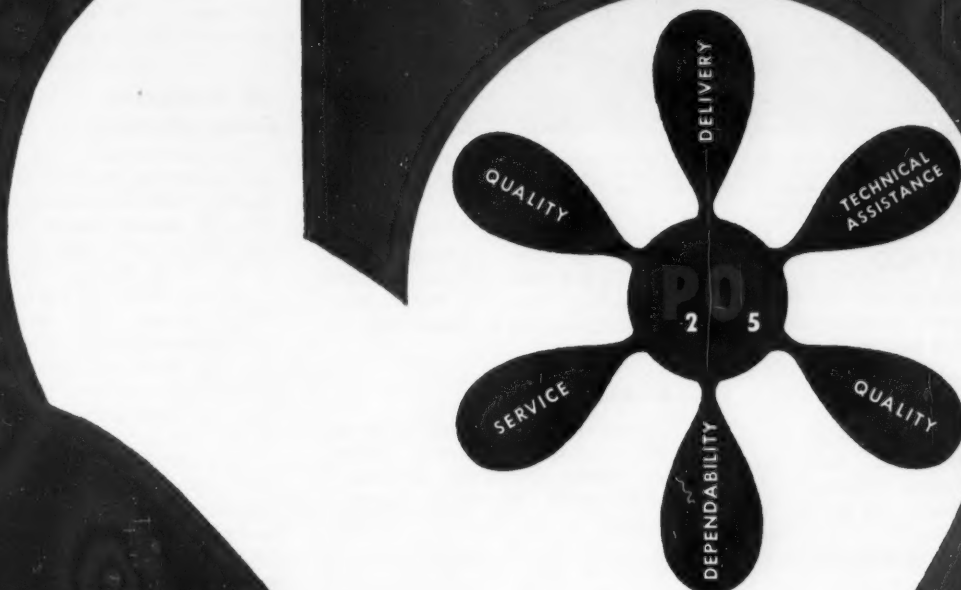
## MISSISSIPPI

**Mississippi Chemical and Coastal Chemical** in a two-day sales meeting heard a forecast by executive vice-president Owen Cooper and general salesmanger R. H. Fisackerly that the two operations will top \$25,000,000 in business in the fiscal year that began July 1. This past fiscal year Mississippi Chemical did \$15,000,000 and Coastal Chemical did \$7,000,000, they reported.

## NEBRASKA

**Farmers Union State Exchange** is building a bulk blending plant at York, which will deliver and apply fertilizer to co-op members within a 25 mile radius. Similar to plants now operating in Illinois and Minnesota, this is said to be the first of its kind in Nebraska.

We have something  
to crow about...



## DAVISON Hi-Flo Gran-U-Lated Triple Superphosphate is unexcelled by any other

✱ (S<sub>1</sub>Q<sub>2</sub>D<sub>2</sub>TA<sub>1</sub>) The Davison formula of properly proportioned parts of Service, Quality, Dependability, Delivery and Technical Assistance (S<sub>1</sub>Q<sub>2</sub>D<sub>2</sub>TA<sub>1</sub>) is as important to you in your choice of source as anything else we could name.

In every field, there is always one particular brand that is so outstanding that it is head and shoulders above the competition. That is true of Davison Hi-Flo Gran-U-Lated Triple Superphosphate. Here is the product that is the standard of comparison for all other granulated triples. Davison Gran-U-Lated Triple Superphosphate is uniform in particle size . . . dust free and will not break down or crumble in the bag. It is ideal for direct application or for formulation of dry materials. Most of all, with Davison Gran-U-Lated you are certain of constant uniformity . . . it is GUARANTEED 46% available P<sub>2</sub>O<sub>5</sub> . . . every time.

A test carload will prove it to you. Simply call us today. The Davison Sales and Technical Representative will be happy to provide complete information.



**W.R. GRACE & CO.**  
DAVISON CHEMICAL DIVISION  
Baltimore 3, Md.



Spencer Chemical Company's Process Development Department will be housed in this new building, soon to be constructed at the company's Research Center in Kansas City. The new building, fourth to be constructed at the Research Center, will have 11,000 square feet of floor space for process development activities and offices.

## NEW MEXICO

**Ravel Brothers** new \$250,000 plant at Albuquerque was scheduled to go into operation August 20, employing 10 to 15.

## NORTH DAKOTA

**Chemical Solids, Inc.**, Grand Forks, has been incorporated for \$50,000 to make and sell farm and industrial chemicals by Alan J. Twomey, Paul B. Kampf and Frank G. Rumreich.

## OHIO

**American Agricultural Chemical** has awarded to Leonard Construction Co., Chicago, contract for engineering and construction of a \$750,000 contact sulphuric plant at Cairo. It will use elemental sulphur, and the Monsanto vanadium sulphuric acid catalyst. Construction, already under way, is to be completed March, 1960.

## OKLAHOMA

**Nichols Seed & Fertilizer**, which offered its plant for sale, as reported here last month, was directed by the U. S. District Court to reject all bids submitted and call for new bids on September 10. The address is 530 S. Broadway, Oklahoma City.

## OREGON

**Miller Products Co.** has bought a plant in Portland as a major expansion move. \$500,000 will be spent on remodelling by the 40-year old Portland concern. According to president Roy E. Miller, the move

will treble their production space, and permit manufacture of aerosol herbicides, in addition to their present production of fertilizers and other chemicals.

## AFRICA

**Transvaal Gold Mining Estates** have sulphur dioxide gas as by-product of their copper and gold roasting operation. They plan a plant at Graskop in the Eastern Transvaal to convert the gas to sulphuric acid which in turn will be used with rock phosphate, available close by, to produce superphosphate.

## CANADA

**Continental Potash**, with new financing, has been able to resume work on its potash property in Saskatchewan which was interrupted in mid-1958, at the half-way point.

• • •

**Potash Co. of America's** Canadian subsidiary expects to begin commercial production at Saskatoon, Saskatchewan, next month or the month after. The great depth of the soft and thicker ore beds have delayed the start. \$22,500,000 has been spent in getting ready to run.

## CHINA

**Communist China** is reported, via Tokyo, to be building a plant near Chengtu which will turn out 240,000 annual tons of sulphuric acid, 290,000 of ammonium sulphate, 55,000 of ammonium nitrate, and "tens of thousands of tons" of nitric acid.

## IRAN

**The Government** plans for a fertilizer plant near Ahwaz have been

deferred, along with other chemical development projects, due to lack of capital.

## MEXICO

**Texas International Sulphur** has begun production at the rate of 9,000 monthly tons from its wells on the isthmus of Tehuantepec. The program calls for lifting this figure to as much as 2,000 daily tons. Proved reserves total more than 5,000,000 tons on 130 acres, with unexplored concession of 123,000 acres.

## 50 Tennessee Demonstrations

The Tennessee Soil Fertility Demonstration Program is well underway with an average of more than 50 demonstrations in each of the five "pilot" counties, according to Dr. W. D. Bishop, University of Tennessee Extension agronomist.

The general plan was for the demonstrations to be of three types: first, get the farmer to treat a field according to soil test recommendations and leave a check plot; second, if not a whole field, try an acre with a check plot; third, a plan that was well suited to the more reluctant prospect, the county agent and his co-workers treated a one-twenty-fifth acre plot according to the soil test recommendation and the remainder of the farmer's field served as the comparison plot. The agents did most of the work themselves including furnishing the fertilizer which was donated by local fertilizer dealers. Agents report that all the fertilizer companies doing business in their counties have cooperated by donating materials.

Demonstration sites were well marked with attractive metal signs in the University of Tennessee school colors of orange and white with black lettering. When the demonstrations show a visual difference between treatments, smaller signs 14" x 21" are placed on the different treatments. These small signs list the soil test levels and the lime and fertilizer used.

The next phase of the Tennessee program is scheduled for this fall, when an intensified promotional program to encourage soil testing will get underway, making use of the information collected from the demonstration phase of the program now in progress. This phase will point out the advantages of using fertilizer and lime as needed based on soil test results. This work is supported in part by an NPFI grant.



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**→ RUN-OF-PILE**

Fine texture, uniform particle size, high porosity and low moisture content for high rate of ammoniation.

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Free flowing uniform particle size, dust free, drills free for uniform distribution of plant food—Guaranteed 46%  $P_2O_5$ .

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For intermediate ammoniation to produce a semi-granular product—Controlled screen size—Honeycomb structure—High Water Soluble  $P_2O_5$ .

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*Division*

TENNESSEE



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**Extended Life Insurance  
For Fertilizer Plants  
And Equipment . . .**

Suprene Chemical Resistant Coating has been especially developed for service under severe acid or alkali fumes, moisture vapors and condensates normally found in agricultural and industrial chemical plants. It may be applied to steel, concrete, wood or fabric using brush, roller or dip methods and will air dry in a period of from 1/2 hour to 2 hours depending upon conditions present at time of application. This coating has unusual adhesion qualities and a flexible tough surface which is highly resistant to corrosion and abrasion.



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# POTASH

## DELIVERIES RISE 17% FOR '58-'59

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii by the eight American potash producers and importers totaled 3,968,323 tons of salts containing an equivalent of 2,325,485 tons  $K_2O$  during the fertilizer year of July 1958 through June 1959, according to the American Potash Institute. This was an increase of 17% in salts and  $K_2O$  over the preceding fertilizer year.

Continental United States took 2,166,458 tons  $K_2O$ , Canada, 98,857 tons, Cuba, 14,682 tons, Puerto Rico, 22,218 tons, and Hawaii, 23,270 tons  $K_2O$ . These figures include imports of 252,299 tons  $K_2O$  for this period, an increase of 7%. Exports to other countries were 236,395 tons  $K_2O$ , an increase of nearly 28%. Deliveries of potash for non-agricultural purposes amounted to 141,282 tons  $K_2O$ , an increase of over 18%.

Total deliveries for all purposes were 4,591,601 tons of salts containing an equivalent of 2,703,162 tons  $K_2O$ , an increase of 18% in salts and  $K_2O$  over the last year.

Illinois with 233,434 tons  $K_2O$  was the leading state for deliveries followed in order by Indiana, 176,046; Ohio, 170,904; Georgia, 158,588; Florida, 130,566; and Virginia, 120,851. Deliveries do not necessarily correspond to consumption in a given state.

Muriate of potash was the principal grade, comprising over 93% of the total agricultural potash delivered while sulphate of potash and sulphate of potash-magnesia together made up over 6% of deliveries.

### Potash Deliveries up 8% During First Half of 1959

Deliveries of potash for agricultural purposes in the United States, Canada, Cuba, Puerto Rico, and Hawaii totaled 2,110,722 tons of salts containing an equivalent of 1,237,370 tons  $K_2O$  during the first six months of 1959, according to the American Potash Institute. This was an increase of 8% in salts and  $K_2O$  over the same period in 1958. Continental United States took 1,159,692 tons  $K_2O$ ; Canada, 44,119 tons; Cuba, 3,359 tons; Puerto Rico, 16,795 tons; and Hawaii, 13,405 tons  $K_2O$ . These figures include imports of 112,339 tons  $K_2O$  for the first six months of the year, an increase of more than

15% over last year. Exports to other countries were 119,994 tons  $K_2O$ , an increase of 7%. Deliveries of potash for non-agricultural purposes amounted to 75,128 tons  $K_2O$ , an increase of 43% over last year. Total deliveries for all purposes were 2,432,678 tons of salts containing an equivalent of 1,432,492 tons  $K_2O$ , an increase of nearly 10% in salts and  $K_2O$ .

During the second quarter of 1959, deliveries for agricultural purposes were 664,208 tons  $K_2O$  in continental United States; 22,687 tons in Canada; 2,865 tons in Cuba; 15,295 tons in Puerto Rico; and 8,776 tons in Hawaii, making a total of 713,831 tons  $K_2O$ , an increase of more than 19% over last year. Included in these figures are imports of 112,339 tons  $K_2O$  for the first six months of the year. Exports of potash to other countries during the second quarter were 60,556 tons  $K_2O$ , a decrease of about 1% under last year. Deliveries of potash for non-agricultural purposes were 39,012 tons  $K_2O$ , an increase of nearly 58%. Total deliveries for the quarter including imports for the first six months, were 1,376,748 tons of salts containing an equivalent of 813,399 tons  $K_2O$ , an increase of more than 18% in salts and 19% in  $K_2O$  over last year.

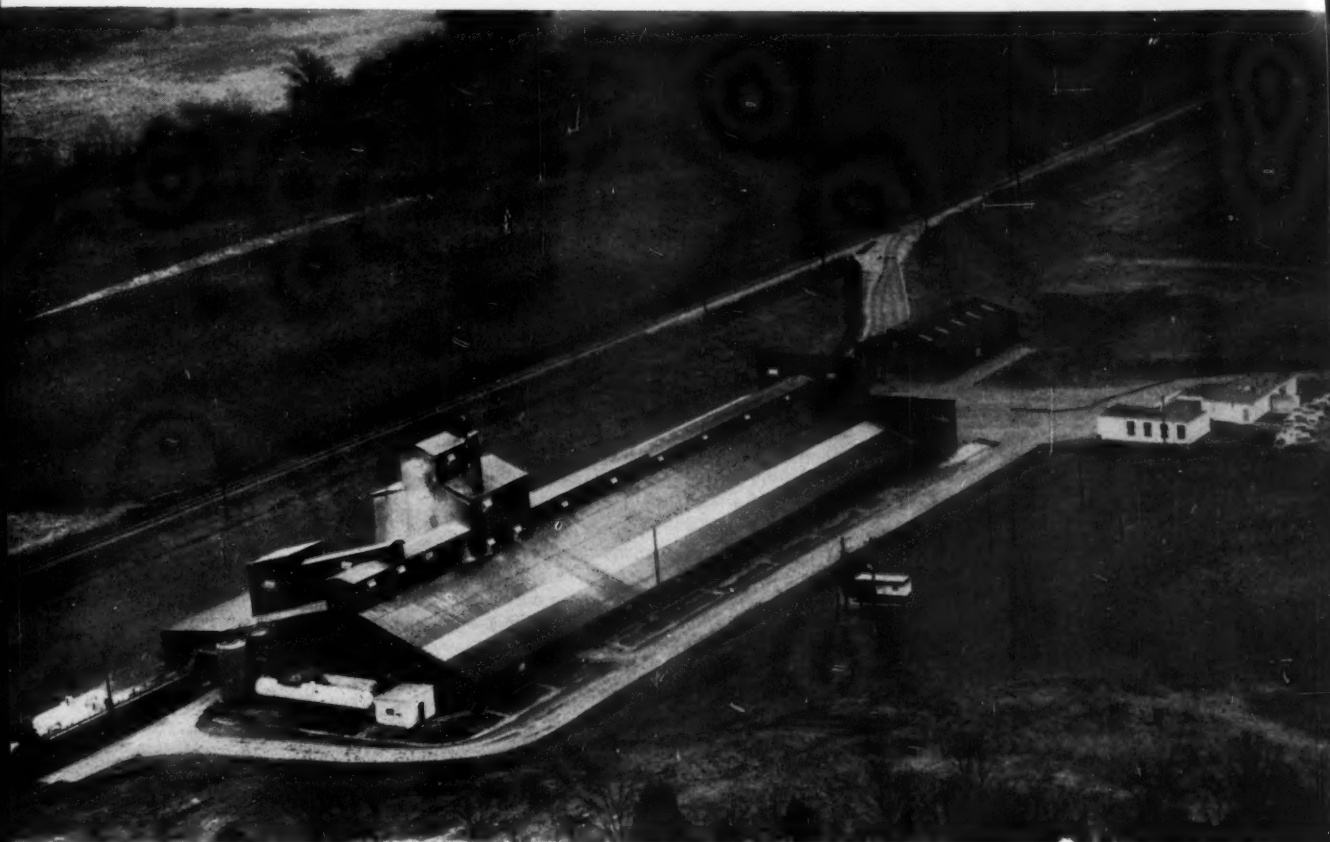
### Georgia Agronomists See Problem Areas

The University of Georgia Agronomists and Georgia Section of American Society of Agronomy and The Soil Science Society of America held their summer meeting June 24-26, 1959.

Dean D. Hayes, Superintendent of the N.W. Georgia AES, welcomed the group and pointed out some of the problems that were characteristic of the Limestone Valley Area. A tour of the station was conducted and various research workers reported on the projects now in progress.

On June 25, the agronomists toured the Georgia Mountain Experiment Station, Blairsville, Georgia, under the direction of Mr. John Bailey, Superintendent, who explained that the station was founded primarily to solve problems of the Mountain area.

The group visited the Tennessee Corporation plant at Copperhill, Tenn.



## A NEW PLANT FOR KENTUCKY . . . A NEW RECORD FOR SACKETT

Here's a brand new granular plant for Kentucky . . . and a remarkable new construction record for The Sackett Company.

Recently completed at Russellville for Cooperative Fertilizer Service of Richmond, this big and fully automated ferti-

lizer manufacturing facility\* was built by us in 6 short months.

This is the kind of field performance that Boards of Directors and top management people are looking for . . . the kind they are finding in Sackett . . . *and at the right price, too!*

\*Including offices, service buildings and rail sidings



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- RELATED PRODUCTION EQUIPMENT

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## Howell

Joseph A. Howell of Richmond, Virginia, August 11 announced his resignation as chairman of the Fertilizer Committee for Tax Equality and that he is no longer a consultant to the National Tax Equality Association.

## Ashcraft-Wilkinson

Trenton R. Tunnell has been named president of Ashcraft-Wilkinson Company, Atlanta, according to an announcement by George W. McCarty, chairman of the board.



**Tunnell**

Mr. Tunnell succeeds Van W. Wilkinson, who has been made vice-chairman of the board.

Formerly executive vice-president, Mr. Tunnell has spent his entire business career with Ashcraft-Wilkinson Company, becoming associated with the company in 1920.

Ashcraft-Wilkinson is one of the nation's largest sales agencies for fertilizer materials and agricultural chemicals.

In addition to the firm's home office located in Atlanta, Ashcraft-Wilkinson maintains sales offices in Norfolk, Va.; Charleston, S. C.; Tampa, Fla.; Jackson, Miss.; Columbus, Ohio; Montgomery, Ala., and Des Moines, Iowa.

## American Potash Institute

Dr. R. E. Wagner, head of the Agronomy department at the University of Maryland, joined the American Potash Institute as director of its Eastern region September 1, according to Dr. H. B. Mann, president of the Institute.



**Wagner**

A nationally known agronomist and forage crops authority, Dr. Wagner will serve the states from Virginia through Maine, administering the Institute's various services to the land-grant colleges, official agricultural advisors, and fertilizer representatives in the area. Associated with him will be Dr. S. E. Younts, Eastern agronomist of the Potash Institute.

Dr. Wagner is chairman of the Grassland Improvement Steering Committee of the American Society

# PEOPLE in the

of Agronomy, chairman of the Society's Division VIII, past member of its Board of Directors, and former member of the Executive Committee of the Crops Science Society.

## Ke-Wash

Ke-Wash Fertilizer Company, Keota, Iowa, announces the addition of Robert Deeds to their staff as production manager. Mr. Deeds comes to them from Nichols Seed and Fertilizer Company of Oklahoma City, Oklahoma. Prior to that he was with Snyder Chemical Company of Topeka, Kansas. He has had some ten years experience in the fertilizer business. The announcement was made by Donald J. Fossick, general manager.

## Lyons Fertilizer

W. L. Waring, Jr., was elevated to chairman of the board and chief executive officer of Lyons Fertilizer Company, Tampa, Florida, at the annual meeting of the board of directors.

Other officers named were, W. F. McLane, elected president; E. J. Charette, executive vice president and general manager; J. C. Wolfe, vice president and sales manager; P. W. Pervost, secretary and treasurer and Robert Bertram, assistant secretary and treasurer.

Mr. Waring said the fiscal year just closing was one of the most successful in the company's history.

## Hooker

H. William Kopp Jr. has been appointed works manager and Theodore T. Garrett named technical superintendent at the Columbia, Tenn., plant of the phosphorus division of Hooker Chemical Corporation, it is announced by Robert E. Noble, assistant general manager of the Division. John W. Bunch has been appointed works manager of the Dallas, Texas, plant, succeeding Mr. Kopp.

R. George Hartig and James D. Thaler have been named supervisors of process design and plant design respectively, for Hooker's Phosphorus Division, with headquarters at Jeffersonville, Ind. They will report to E. J. Bissaillon, technical manager.

## NPFI

Louis H. Wilson, secretary and director of information for the National Plant Food Institute, was elected to the board of directors of the American Association of Agricultural College Editors, at their annual conference.

He became the first associate member representative of the Association to be elected to office in the 43-year history of the organization which embraces state extension and experiment station editors in the land-grant colleges.

Ralph Reeder, Associate Director of Agricultural Information, Purdue University, Lafayette, Ind., was elected president of the Association.

## IMC

Joseph J. Boziss has been appointed manager of customer service and Richard G. Powell manager of technical service for the materials de-



**Boziss**



**Powell**

partment of the new agricultural chemicals division of International Minerals & Chemical Corporation.

The two departments were organized to support the "full line" selling of the new division, which combines the potash, phosphate minerals, and phosphate chemicals divisions.

The customer service department will be the principal communication center between customer and company working out problems such as method of transportation, exact product specifications, delivery date, and follow-up requirements.

Technical service will be available to the manufacturer for his total formulation problem, without undue emphasis on either phosphate or potash. This department will assist in areas such as choice of equipment, more efficient plant layout, materials handling, cost reduction, general formulation procedures, and statistical quality control.



# INDUSTRY

## Cominco Products

K. T. Seaborne, manager of Cominco Products, Inc., has announced appointment of G. R. Inkpen to the position of assistant manager.

Cominco, a Spokane, Washington firm, was formed in 1956 to distribute in United States Elephant Brand Fertilizers and other products of The Consolidated Mining and Smelting Company of Canada Ltd.

Mr. Inkpen has been associated with the manufacture or sale of chemical fertilizers since 1942. He has been with Cominco Products, Inc. since its inception and previous to his present appointment was assistant sales manager.

## Agrico

B. L. Emkes has been named manager of Agrico's Seymour, Indiana, sales office, it has been announced by W. J. Turbeville, Jr., vice president.



Gravitte



Emkes

ident in charge of fertilizer sales for The American Agricultural Chemical Company.

Mr. Emkes was formerly assistant manager at Seymour. He joined the Agrico organization when the company purchased the Buhner Fertilizer Company plants at Seymour and Danville, Illinois in 1957.

R. T. Gravitte, former assistant sales manager at Agrico's Cincinnati office, has been transferred to London, Kentucky, in the same capacity.

## Connecticut AES

Bruce B. Miner, editor of The Connecticut Agricultural Experiment Station, has been elected to membership in the National Association of Science Writers.

The association was organized 25 years ago to foster the dissemination of accurate scientific knowledge by the press of the nation in cooperation with scientific organizations and individual scientists.

## Priddy

George F. Reed has been elected a vice president of Chas. W. Priddy & Co., Norfolk, Va.

Mr. Reed will be in charge of the Norfolk Bag Company, a division of the company. He has been with them over a long period of years, most of which were devoted to the bag company, and is well qualified for his new duties.

He will leave about the middle of October for a six-week visit to Calcutta and Pakistan, where he will study cultivation of the jute crop and the manufacture of burlap.

During his absence, bag and burlap sales will be handled by his associates, Messrs. Gale and Ridgwell.

## U. S. I.

Edward C. Richardson has been appointed Chicago division sales



Richardson



Hallowell

manager for U. S. Industrial Chemicals Co., division of National Distillers and Chemical Corporation. The announcement was made by A. R. Ludlow, Jr., vice president in charge of sales. Mr. Richardson replaces the former Chicago Sales Manager, George H. Stanton, who is now the Company's Director of Field Sales.

Jesse H. Hallowell has been named Boston sales division manager for U.S.I., replacing Mr. Richardson.

## SCOCO

C. M. Smith Sr., manager of the Little Rock mill of the Southern Cotton Oil Company, division of Wesson Oil and Snowdrift Co., retired August 31 after having served 41 years with the company.

John R. Laughlin, manager of the Southern Cotton Oil mill at Decatur, Alabama, will succeed Mr. Smith at Little Rock. The retiring executive will continue in an advisory capacity.

## American Cyanamid

Frank H. Cappy, advertising manager for American Cyanamid Company's Agricultural Division, has been assigned additional responsibilities for public relations and packaging development, it was announced by B. F. Bowman, divisional marketing director.

Mr. Bowman also announced the appointment of promotion managers for each of the division's three basic product categories.

Appointed to the newly created post for the phosphates and nitrogen department is R. G. Tousey.

The new managers will be responsible for all phases of sales promotion and advertising for their product lines, Mr. Bowman said.

## Summers

James C. Totman, vice president of Summers Fertilizer Company of Baltimore, Maryland and Northern Chemical Industries of Searsport, Maine resigned from both companies as of July 31, 1959. He and his family expect to shortly establish themselves in Geneva, Switzerland.

He has been connected with these companies for the past twelve years in the sales and administrative divisions. While manager of the Bangor, Maine offices, he was also interested in city and state politics. He was chairman of the Bangor City Council for three years and member of the state legislature for eight years. In Geneva, he plans to represent American industries operating in Western Europe.

## U. S. Borax

United States Borax & Chemical Corporation announces the appointment of James C. Britton as agronomist in the plant food development department of its United States Potash Company Division effective September 1. He will be located at West Lafayette, Ind., to direct research and sales development of plant food borates for the midwestern and northeastern areas of the U. S. and eastern Canada.

Appointment of John Yannacakis to the new product development department of U. S. Borax Research Corporation, Anaheim (Calif.), a subsidiary of United States Borax, is announced by Dr. D. S. Taylor, vice president and general manager of the research company.

The appointment of Leland W. Milligan, Jr., to the chemical engineering research department of the Research Corporation, as a research engineer, has been announced. He will be headquartered at



**MURIATE  
OF POTASH  
for the  
PLANT FOOD INDUSTRY**

**T**His symbol stands for high-grade uniform, coarse and granular Muriate of Potash (60%  $K_2O$  minimum). Southwest Potash Corporation provides a dependable supply of **HIGH-K\*** Muriate for the plant food industry.

\* Trade Mark

**Southwest Potash  
Corporation**

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Boron (Calif.) where he will be assigned to the department's process improvement research section.

Appointment of James O. Brown as manager of finished products for the production department of the Pacific Coast Borax Company division of United States Borax & Chemical Corporation is announced by R. T. Edgar, divisional vice president.

Mr. Brown will be responsible, Mr. Edgar said, for the coordination of scheduling for packaging, loading and shipping of finished products as sales may require.

**Consumers Coop**

Gordon E. Hoath became manager of fertilizer manufacturing for Consumers Cooperative Association, Kansas City, Mo., September 1.

In the new position he will have full supervision of CCA's fertilizer manufacturing plants at Muskogee, Okla., St. Joseph, Mo., and Eagle Grove.

Since 1949 Mr. Hoath has been manager of CCA's fertilizer and protein plants at Eagle Grove. He had joined the staff in 1947.

**V-C**

Charles T. Harding, executive vice president of the Virginia-Carolina Chemical Corporation, was elected to the company's board of directors. This is Mr. Harding's third major promotion at V-C in the past five months.

At the same time, the board elected Dr. William P. Boyer vice president, and Wallace T. McKeel treasurer. Dr. Boyer is the head of V-C's Chemicals division and Mr. McKeel was assistant treasurer.

The new treasurer assumes some of the duties of Amos M. Schuster who will continue to serve the company as administrative vice president.

V-C announces the following changes in its fertilizer sales organization:

Wallace H. LaPrade, formerly district manager in Orrville, Ohio, has been appointed manager of specialty products. He will handle sales of nitrogen solutions and co-ordinate sales of V-C's Lawn Builder fertilizer.

William J. Bryan, salesman in the Cincinnati district, has been named acting district manager at Orrville.

C. H. Godfrey, former regional manager for the midwest, has been appointed manager of triple superphosphate sales.

Harold A. Dale, formerly assistant to the manager at Shreveport, Louisiana, has been named district manager at Hopkinsville, Kentucky.

In V-C's bag division, Riley Milam, formerly office manager for the company's Atlanta, Georgia, plant, has been named sales service manager for the division.

### Spencer

Kenneth A. Spencer has announced that the board of directors has



**Spencer**

effected the following changes in officers of Spencer Chemical Company, Kansas City, Mo.

Kenneth A. Spencer, formerly president, was elected chairman of the board and

chief executive officer.

C. Y. Thomas, formerly general vice-president-operations, was elected vice-chairman of the board.

John C. Denton, formerly vice-



**Kern**



**Denton**

president-agricultural chemicals division, was elected president.

John P. Miller, formerly general vice-president-finance, was elected senior vice-president-finance.

Joe E. Culpepper, formerly general vice-president-marketing, was elected senior vice-president-marketing.

Byron M. Kern, formerly general manager of production-agricultural chemicals, was elected vice-president-agricultural chemicals.

Kenneth A. Spencer, as chairman of the board, will continue to be the chief executive officer of the company. He has been president and chief executive officer since the company's inception in 1941.

Mr. Denton, who has held various engineering, production and management positions with the company since he joined it in 1942, will, as president, be the chief operating officer of the company. Mr. Denton was also elected a member of the board of directors and of the executive committee of the board.

### Sohio

Thomas P. Mericle, Jr., has been appointed agricultural sales representative with headquarters in Louisville, Kentucky, for the Sohio Chemical Company of Lima, Ohio, according to George W. Cosper, manager of agricultural sales.

Mr. Mericle has been with Sohio since July of 1958 and most recently has been staff assistant in the agricultural sales section at Sohio.

### Bemis

Three personnel changes within the eastern operations of the Bemis

Bro. Bag Company were announced by F. G. Bemis, president.

R. V. Scott, director of eastern operations and company director, New York, will transfer to St. Louis as assistant director of sales for the company.



**Scott**



**Goolsby**



**Raikes**

A. F. G. Raikes, manager, New York general sales division, will assume Mr. Scott's duties as director of eastern operations, and will be succeeded by J. B. Goolsby, area sales manager at the Brooklyn sales division.

Mr. Scott, who joined Bemis at its Kansas City plant in 1931 as an accountant, has served as director of eastern operations since early in 1957. He previously served six years as manager of the company's Chicago general sales division.

Mr. Raikes began as a sales representative with the company, joining the Kansas City sales division in 1938.

Mr. Goolsby's entire service with Bemis, 22 years, has been in the Brooklyn sales division.

### Yale & Towne

J. J. Curry, a veteran of more than eight years in the sales and service of industrial lift truck equipment, has been named Midwest regional sales manager by Yale Materials

Handling division, The Yale & Towne Manufacturing Company, by Clyde R. Dean, Jr., general sales manager.

The new manager will supervise and coordinate activities of Yale factory sales and service branches and franchise representatives in the states of Michigan, Ohio, Indiana and Kentucky.

### Gilman Paper

H. C. Lawless, vice-president and director of sales for Gilman Paper Company and its subsidiaries, St. Marys Kraft Corporation and Kraft Bag Corporation, announces, effective August 17th, appointment of H. D. Wellington to the newly-created post of assistant general sales manager, with headquarters at 630 Fifth Avenue, New York. "Dean" Wellington formerly was Western sales manager, located in Gilman Paper Company's Chicago office, in the Daily News Building. J. S. Ritter, formerly assistant, becomes Western sales manager, with headquarters in Chicago. J. J. McDermott becomes Mr. Ritter's assistant.

### Fertilizer Men Elected by Controllers

Keith B. Anderson, comptroller, Riverside Oil Mill, Marks, Miss., has been elected secretary-treasurer of the Memphis Control of the Controllers Institute of America.

At the annual meeting of the Institute's Chicago Control, Adrian H. Van Kampen, controller-chemical industries, Armour & Co., was named a director.

### obituaries

**Donald W. Aitken, Sr.**, 51, and Mrs. Aitken died together of carbon monoxide poisoning in their house trailer, July 24 while on vacation in Colorado. He was president of Midwestern Phosphate Corp., Madison, Wisconsin, which operates the Kickapoo Fertilizer Plants at Hillsboro and Stevens Point.

**Edward Ryland**, 78, retired V-C vice-president, died June 29 in Richmond, Virginia.

**Arthur P. Spencer**, 82, former director of the Florida AES, died July 27 after a brief illness. In 1939 he was named Progressive Farmer's Man of the Year.

**Ray B. Worthy**, 68, former president of Mathieson Chemical, died July 26 at Saltville, Virginia of a heart attack.



# INDUSTRY CHANGES

## **Smith-Douglass, Smith Merger**

Stockholders of Smith-Douglass Co. Inc. have approved and adopted an agreement of merger, it was announced August 7.

W. R. Ashburn, Smith-Douglass president, and W. F. Farley, president of Smith Agricultural, issued a joint statement on the merger agreement, but said the effective date may be deferred until certain conditions have been ascertained.

Under the merger plan, Smith-Douglass Co. Inc. continues as the name of the joint operation with headquarters in Norfolk.

Smith Agricultural, which operates four fertilizer manufacturing plants, is headquartered in Columbus, Ohio. Its plants are located in Ohio, Indiana and Michigan.

## **Farm Fertilizers Buys General**

Farm Fertilizers, Inc., Omaha, Neb., has purchased General Fertilizer Company of Fremont, Nebraska. They will operate this as a wholly owned subsidiary of Farm Fertilizers, Inc., according to Richard E. Bennett, president of the company.

General Fertilizer Company have been in production since 1953 and have had an important part in the development of the fertilizer industry in Nebraska.

## **IMC Buys Miami Fertilizer**

International Minerals and Chemical Corporation has announced purchase of the Miami Fertilizer Company at Trebein, Ohio, near Dayton.

The Company is the producer of 'Big M' dry granular fertilizers, sold principally in the Miami Valley area of Ohio. Facilities include a fertilizer mixing plant and a granulating unit. Charles F. Martin will continue to manage the plant, with Clarence Crickmore in charge of production.

International Minerals has a total of 68 plants in the United States, Canada, and Mexico, 25 of them fertilizer plants.

## **IMC Re-Aligns Sales, Production**

The plant food division of International Minerals & Chemical Corporation has announced realignment of its sales organization and production facilities in seven central and south-central states.

John D. Zigler, general manager of the division, said the change involves three plants and five sales districts, and will provide improved customer service in three of the division's most important areas.

They are:

Cincinnati Area—(Ohio, Southern Indiana, Kentucky), extended to include Eastern Tennessee, and Southwestern Virginia.

Tupelo (Miss.) Area—(Alabama, Mississippi, Southwestern Tennessee) extended to include Western Tennessee and Western Kentucky.

Atlanta Area—(Georgia, North and South Carolina border counties), district sales offices opened in Americus and Tifton, Georgia (where IMC has fertilizer plants) replacing a district office in Albany.

The Cincinnati area will continue under the direction of Harold H. Douthit. Other plants and offices in the area are at Somerset, Kentucky, and Greeneville, Tennessee. Mr. Douthit announced the following revisions and personnel changes for the area:

The Greeneville, Tennessee, district, which includes plants and offices at Somerset, Kentucky, and Greeneville, was transferred from the Atlanta area to the Cincinnati area. A single plant and office in the Clarksville, Tennessee, district was transferred to the Tupelo, Miss. area.

James H. Sibley, district sales manager at Clarksville, was promoted to district sales manager at Greeneville. He replaces Sam B. Broyles, who retires October 1.

The Tupelo, Miss. area continues under Sam P. Marshall, area manager. He will direct sales and operations at Clarksville, Tennessee; Florence and Cullman, Alabama and Tupelo.

Personnel changes in the Cincinnati area as announced by Mr. Marshall are:

E. Harold Harris, sales repre-

sentative, Clarksville, promoted to district sales manager there, replacing James H. Sibley, who was promoted to district sales manager at Greeneville.

Stanton D. Maple, a production supervisor at Texarkana, Arkansas, promoted to superintendent at the Clarksville plant, replacing J. H. Whitesides, promoted to superintendent of Tifton, Georgia, plant.

The Atlanta, Georgia, area continues under William L. Baughcum, area manager in charge of operations and sales at East Point (suburban Atlanta), Augusta, Americus and Tifton, Georgia. He announced the following personnel changes:

Norton Futch, sales representative at Albany, promoted to district sales manager at Americus, and W. P. Burke, former district sales manager at Albany, transferred to Tifton as sales manager of the new district.

Malcolm W. James, general foreman at the Americus plant, promoted to plant superintendent.

J. H. Whitesides, plant superintendent at Clarksville, Tennessee, replaces T. M. Freeman, plant superintendent at Tifton, who retires after 38 years service.

## **Ag Chem Ltd. Buys Grand Valley**

Agricultural Chemicals Ltd., Port Hope, Ont., has bought the factory and physical assets of Grand Valley Fertilizers Ltd., at Orangeville, Ont. With the addition, Agricultural Chemicals now operates four fertilizer plants in Canada at Orangeville, Port Hope, London, Ont., and Fort Chambly, Que.

## **Southern Industrial Equip. Represents Yale**

Southern Industrial Equipment Co., Miami, Florida, has been named franchise representative for the sales and service of Yale industrial lift trucks and tractor shovels, according to an announcement made by Clyde R. Dean, General Sales Manager, Yale Materials Handling Division, The Yale & Towne Manufacturing Company.



# New 500 TPD Concentrated Fertilizer Plant Now On Stream for **Scottish Agricultural Industries Ltd....**

## **Granulation section designed by Dorr-Oliver Incorporated**

On March 17, 1958, Scottish Agricultural Industries Ltd. inaugurated their new 8.5 million dollar plant at Leith, Scotland, for producing ammonium phosphate based complete granular fertilizers. The new Leith plant includes three main process units—sulfuric acid production, phosphoric acid production and a fertilizer production section. The fertilizer section, designed by Dorr-Oliver Incorporated, utilizes the world-wide accepted Dorcco Granular Fertilizer Process.

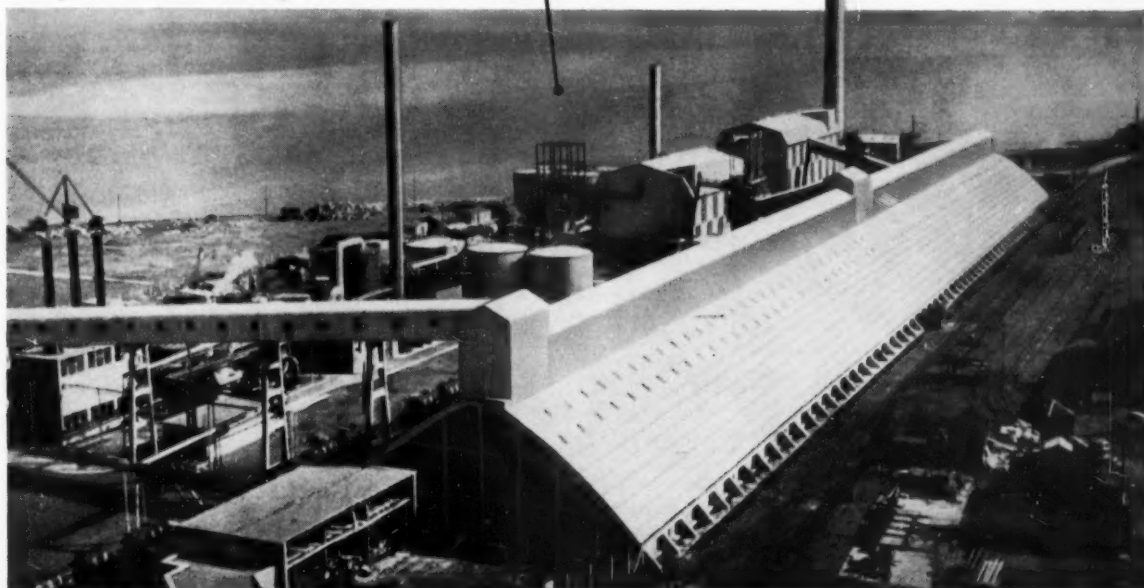
Dorr-Oliver Project Sales Division, with over 41 years' experience in the field of concentrated fertilizer production via the wet process of manufacturing phosphoric acid, is staffed by engineers qualified to handle all phases of fertilizer plant design — from beneficiation of phosphate rock through laboratory studies and economic evaluation, to supplying a complete plant regardless of size.



**DORR-OLIVER**  
INCORPORATED

WORLD - WIDE RESEARCH • ENGINEERING • EQUIPMENT  
STAMFORD • CONNECTICUT • U. S. A.

Aerial view of S.A.I.'s newly completed concentrated fertilizer plant. Dorr-Oliver designed Granulation Section is located in building in front of stack at extreme right.



# SOUTHWEST FERTILIZER CONFERENCE

Nearly 300 industry representatives, experiment station personnel and fertilizer control officials registered for the annual Southwestern Fertilizer Conference and Grade Hearing at the Galvez Hotel July 15-18.

An educational program on Thursday morning included talks by Dr. Russell Coleman and R. L. Beacher outlining Southwestern activities of the National Plant Food Institute, emphasizing the progress of intensified county soil fertility programs in Arkansas, Texas, and Louisiana. These trial programs, conducted by the state extension services with Institute assistance, have met with

## Key To Pictures

1. Bob Fisackerly, Miss. Chemical Corp., Yazoo City; Harold Trammell, Farmers Fertilizer Co., Texarkana; A. T. Edwards, Red Star Fertilizer Co., Sulphur Springs.
2. George Bragg, Jr., Western Fertilizer Co., Muleshoe, Tex.; H. J. Trammell, Farmers Fert. Co., Texarkana.
3. Dan Ellis, Ozark Mahoning Co., Tulsa; John Zigler, International Minerals & Chemical Corp., Skokie.
4. Jack Timmons, Radio Station KWKH, Shreveport; Jack Carlisle, Jacksonville Fert. Co., Jacksonville, Tex.; Jud Drewry, International Minerals & Chemical Corp., Atlanta.
5. Floyd W. Prather, Central Texas Fertilizer Co., Comanche; Ira Moss, Shreveport Bank & Trust Co., Shreveport; J. C. O'Neal, Monsanto Chemical Co., Shreveport.
6. Ernest Thorne, Deere & Co., Pryor, Okla.; J. H. Lanier, San Jacinto Chemical Co., Houston.
7. Ernest Spivey, Miss. Federated Coop., Jackson; Neal Schemet, International Minerals & Chem. Corp.; Glenn Weaver, Texas Farm Products Co., Nacogdoches.
8. A. L. McQuary, Delta Fertilizer Co., Helena, Ark.; N. D. Morgan, Jr., American Potash & Chem. Corp., Shreveport.
9. Joe Wright, Texas Farm Products Co., Nacogdoches; Jack Timmons, Radio Station KWKH, Shreveport.
10. W. S. Tyler, Longhorn Construction Co., Sulphur Springs.
11. John Zigler, International Minerals & Chemical Corp., Skokie; Clyde Marshall, Commercial Solvents Corp., New York.
12. Dr. M. B. Sturgis, La. State University; Z. H. Calhoun, Southern Cotton Oil Co., Little Rock; Lloyd Dhonau, Arkansas Plant Food Co., North Little Rock.
13. Sherman Clark, Texas Gulf Sulphur Co., Houston; Dick Powell, International Minerals & Chemical Corp., Maplewood, Mo.
14. Don Miller, Armour Fert. Works, Houston; Harry Carroll, Potash Co. of America, Shreveport.





1. J. H. Drewry, Atlanta, S. B. McCoy, Skokie, Neal Schemet, all with International Minerals & Chemical Corp.

2. Ken Winburn, Best Fertilizer Co., Houston; George Klein, Davison Chemical Co., Baltimore; Charles Odum, and Russell Dellinger, both with Best Fertilizer Co., Houston; C. K. Bratcher, Davison Chemical Co., Baltimore.

3. Bob Linderman, International Minerals & Chemical Corp., Skokie; Joe Scruggs, Potash Co. of America, Atlanta; Earl Day, Ark-Mo Plant Food Co., Corning, Ark.; Bill Porterfield, Freepot Sulphur Co., New York; Wm. Appleton, Potash Co. of America, Atlanta.

4. Mr. & Mrs. S. M. Hackett, Dixie Fertilizer Co., Shreveport; Mrs. Jimmy Powledge, National Hotels; Mr. & Mrs. Harold Hoffman, International Minerals & Chemical Corp., Shreveport.

5. Voris King, Damon Robinson, both with Kelly Weber & Co., Lake Charles, La.; John M. Davis, Campbell Fertilizer Co., Houston.

6. Mr. & Mrs. Rush McCarty, Deere & Co., Pryor, Okla.; Ernest Spivey, Miss. Federated Coop., Jackson.

7. Mrs. S. M. Hackett, Shreveport; Mrs. W. Q. Burns, Texarkana; Jimmy Powledge, National Hotels; Mrs. Doug Kelly.

8. John E. Foy, Jr., Ahratt-Wilkinson Co., Atlanta; Mr. & Mrs. Bill Young, American Potash & Chemical Co., Shreveport; N. D. Morgan, American Potash Institute, Shreveport.

9. R. L. Beacher, NPFI, Fayetteville, Ark.; J. R. Johnson, Georgia Agric. Extension Service, Athens; N. D. Morgan, Amer. Potash Institute, Shreveport.

10. Dean Smith, Hi-Yield Fertilizer Co., Bonham, Tex.; Roy L. Coufal, Western Fertilizer Co., Levelland, Texas.

11. Leroy Donald, Monsanto Chemical Co., St. Louis; Harold Hamby, Chilean Nitrate Sales Corp., Shreveport; C. K. Bratcher, Davison Chemical Co., Baltimore; Gladin Scott, Monsanto Chemical Co., New Orleans; George Klein, Davison Chemical Co., Baltimore.

12. C. H. Tyler, Longhorn Construction Co., Sulphur Springs; Ed Causey, International Minerals & Chemical Corp., Atlanta; W. S. Tyler, Longhorn Construction Co., Sulphur Springs.

13. Bob Fisackerly, Miss. Chemical Corp., Yazoo City; Earl Day, and L. G. Black, both with Ark-Mo Plant Food Co., Corning, Ark.; Leroy Donald, Monsanto Chemical Co., St. Louis.

marked success in terms of soil sample numbers and will be expanded to additional counties in these states and Oklahoma in coming months. Ralph Johnson, Georgia Extension agronomy leader, gave a stirring report of the Georgia fertilizer educational program results. Dr. J. Q. Lyns, Oklahoma State University agronomist, presented an interesting slide talk and film illustrating results of pasture fertility research in eastern Oklahoma. Jack Timmons, manager of Shreveport Radio Station KWKH, closed the morning session with an amusing and informative address on the need for better salesmanship, considering good sales training the "weakest

link" in achieving potential fertilizer consumption.

On Friday morning, fertilizer control officials from Arkansas, Louisiana, Oklahoma, and Texas reported on consumption trends and changes in recommended and approved grades and materials for the coming year. Arkansas and Oklahoma control officials reported total tonnage increases of approximately 22 to 24% for 1958-59 over the previous years. Louisiana consumption for a nine-month period ending May 31, 1959 was up 14% over last year. In Texas, consumption of mixed goods, through June, was about 4% over the previous year, but abnormally low material sales in June

brought total tonnage down about 1% below the same period last year. Regarding minimum grades approved for the coming year, both Arkansas and Louisiana removed the 5-10-5 from their lists and adopted the 6-12-6 minimum for that ratio as in Texas and Oklahoma. Louisiana also dropped the 1-3-1 ratio.

Conferees enjoyed a full schedule of recreational activities including evening receptions and the annual dinner dance, golf and shuffleboard tournaments, bathing, boating, deep sea fishing, and ladies socials. Next year's conference was set for the Galvez Hotel on July 27-30, 1960.





# CALIFORNIA CONFERENCE



1. John H. Nelson, Conference Co-Chairman, at the microphone.
2. Millard E. McCollam, Chairman CFA Soil Improvement Committee.
3. CFA President Howard H. Hawkins.
4. Left to right: Dr. Daniel G. Aldrich, Jr., Dean of Agriculture, University of Calif., Berkeley and Davis; Howard H. Hawkins, president CFA, Glendora; Dr. Logan S. Carter, Head of Soils Science Dept., Calif. State Polytechnic College, San Luis Obispo.
5. Earl R. Mog and John H. Nelson, Conference Co-Chairman, both

from Stockton; Millard E. McCollam, Chairman, CFA Soil Improvement Committee, San Jose.

6. Panel on Tree Fruit and Vine Nutrition: Millard E. McCollam, moderator at the podium. Panel, left to right: Aldo D. Rizzi, Dr. Omund Lilleland, Dr. Carl Hansen, Dr. James Cook, and Vincent E. Petrucci.

7. Panel on Fertilizer Placement: Dr. J. E. Knott, Moderator, at the podium. Panel, left to right: Dr. Malcolm McVickar, Dr. John Lingle, Dr. Duane Mikkelsen, Dr. Oscar Lorenz and F. J. Hills.

"Land, water and people are prime factors in the development of any agricultural enterprise and certainly have been involved significantly in the growth and character of California agriculture." This was the opening statement of Dr. Daniel G. Aldrich, Jr., who spoke following the banquet on June 29 in connection with the Seventh Annual California Fertilizer Conference at Davis, Calif.

Sponsored by the Soil Improvement Committee, California Fertilizer Association, the Conference attracted 200 persons representative of fertilizer industry management, salesmen and technicians; commercial laboratory personnel; field representatives of canners, sugar refiners and other processors; research

technicians of the University of California, and the several State Colleges; and farmers; according to John H. Nelson and Earl R. Mog, conference co-chairmen.

The Monday morning program was opened by Dr. Stanley B. Freeborn, chancellor of the University of California, with a warm welcome to the campus. He pointed out that one of the first grants received by the College of Agriculture was given by the CFA's Soil Improvement Committee.

Howard H. Hawkins, association president, pointed to the progress of the fertilizer industry since he became a part of it in 1946.

Dr. Oscar A. Lorenz, vice chairman, Department of Vegetable Crops, University of California,

Riverside, presented interesting new information concerning the most effective placement of fertilizer on bed grown vegetables.

Dr. Omund Lilleland, pomologist, University of California, Davis, presented data on proper fertilization practices in deciduous tree fruit orchards.

Dr. James A. Cook, viticulturist, University of California, Davis, reported on recent fertilizer tests in the several grape producing areas of the State.

Robert Z. Rollins, chief, California Bureau of Chemistry, Sacramento, pointed out that his regulatory agency is primarily one which administers those portions of the Agricultural Code of California which pertain to registration, labeling, and



sale of fertilizing materials and agricultural minerals, as well as laws which pertain to pesticides, spray residue, and the agricultural pest control business.

Aldo D. Rizzi, Extension pomologist, University of California, Davis, presented a series of color slides showing nutritional deficiency symptoms in commercial orchards, and of results following corrective treatment.

Dr. J. E. Knott, chairman, Department of Vegetable crops, University of California, Davis, conducted a tour of a number of fertilizer test plots on the Davis campus.

Dr. Aldrich, speaking at the banquet, reviewed the development of California agriculture from the days of the Spanish missions, presidios and pueblos established between 1769 and 1821, to the present time.

On Tuesday morning the program resumed in Hunt Hall on the Davis campus, for two panel discussions. The Panel on Fruit Tree and Vine Nutrition was moderated by Mil-lard E. McCollam, chairman of the Association's Soil Improvement Committee and Western manager, American Potash Institute, San Jose. Panel members were: Dr. Or-mund Lilleland, pomologist, Uni-versity of California, Davis; Dr. Carl J. Hansen, pomologist, University of

California, Davis; Aldo D. Rizzi, Ex-tension pomologist, University of California, Davis; Dr. James A. Cook, viticulturist, University of California, Davis; Vincent E. Pe-trucci, head, Viticulture Depart-ment, Fresno State College, Fresno.

Dr. J. E. Knott, chairman, De-partment of Vegetable Crops, Uni-versity of California, Davis, moder-ated the panel on Fertilizer Place-ment. Panel members were: Dr. Malcolm H. McVickar, chief agron-

omist, California Spray-Chemical Corporation, Richmond; Dr. O. A. Lorenz, vice chairman, Department of Vegetable Crops, University of California, Davis; Dr. D. S. Mik-kelsen, associate agronomist, De-partment of Agronomy, University of California, Davis; Dr. John C. Lingle, Department of Vegetable Crops, University of California, Da-vis; and F. J. Hills, Extension agron-omist, University of California, Da-vis.

## Southeastern Conference Sept. 30-Oct. 1 at Atlanta

Everyone in the industry is in- vited to attend the Southeastern Fertilizer Conference, to be spon- sored by National Plant Food In- stitute at the Biltmore Hotel, At- lanta, Ga. September 30-October 1. Samuel L. Tisdale, Southeastern re- gional NPFI director, emphasized that non-members will be equally as welcome as members of the In- stitute.

Guests will be honored at a re- ception at 6:30 p.m. September 30, and the business session the follow- ing day will begin at 9:30 a.m. and close at 11:30 a.m.

E. T. York, Alabama Extension Service director, will lead off the

session with a talk on "Research and Extension Programs and the Ferti- lizer Industry." A panel on "The Customer Needs Your Products" will follow; panelists include: M. S. Williams, NPFI's chief agricultural economist; E. K. Chandler, NPFI area representative; R. L. Beacher, Southwest regional NPFI director; Jim Turner, U.S. Borax & Chemical Corp., and Joe Burns, Tennessee Extension agronomist.

Joe Bohlen and George Beal, Iowa State rural sociologists, will present "Fertilizer Sales and the Fertilizer Dealer," and Dr. Tisdale will bring the program to a close with "A Summary—Fertilizer Con- sumption in Special Program Areas."

## FERTILIZER INDUSTRY ROUND TABLE

MAYFLOWER HOTEL, WASHINGTON, D. C., NOVEMBER 4-6

### "PRACTICAL PROBLEMS IN PROCESSING FERTILIZERS"

#### Wednesday, November 4

Introductory ..... V. Sauchelli, chairman  
Plant Processes from Raw

Materials to Bagging: L. V. Clegg and Staff, Canadian Industries Ltd.; Al Henderson, Wilson & Toomer Fertilizer Co.; Allen Jackson, Fertilizer Equipment Sales Corp.

Question and Answer Period on Talks Given in Forenoon

Mechanics of Calculating Formulations .... W. J. Tucker, G.L.F. Analytical Laboratory; J. E. Reynolds, Davison Chemi- cal Division; H. H. Tucker, Sohio Chemical Co.

Models Replace Blueprints ..... Wm. C. Weber, Dorr-Oliver Inc.

#### Thursday, November 5

Problems of Conventional Fertilizer Manufacture

##### 1. Mechanical Condition

a. Use of Urea-Nitrate Solutions ..... J. O. Hardesty, U. S. Dept. of Agriculture; H. H. Tucker, Sohio Chemical Co.; G. R. Gilliam, Allied Chemical

b. Use of UAL-solutions ..... J. W. Lewis, E. I. du Pont de Nemours Co.

##### 2. Segregation

a. Particle Size of Raw Materials ..... W. L. Hill, U. S. Dept. of Agriculture

b. Mixing: Rotary and Gravity Mixers .. H. B. Kruger, Stedman Foundry and Machine Co.; Walter Sackett, The A. J. Sackett & Sons Co.; R. E. Robin- son, Atlanta Utility Works

##### Semi-Granular Mixtures

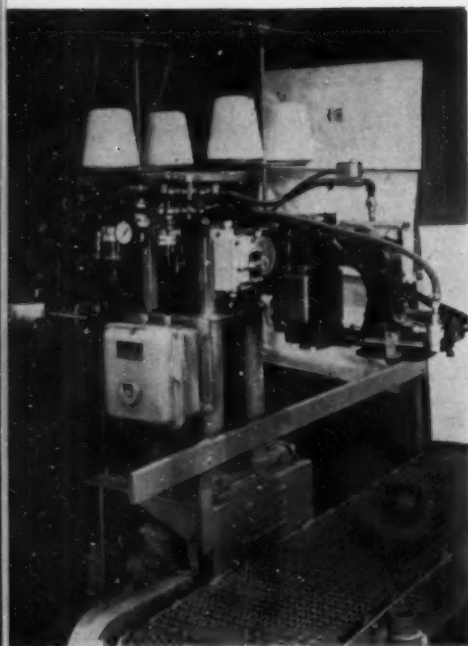
a. Rotary Mixer ..... Enos Valliant, Dorchester Fertilizer Co.

b. Eymann Process .. George Walton, Tennessee Corp.  
c. BlockSparger .. J. C. Sharp, Spencer Chemical Co.; L. D. George, Richmond Guano Co.

Statistical Quality Control .... Chester H. McCall, Booz- Allen Research; Vance Ward, Canadian Industries Ltd.

#### Friday, November 6

Pre-Neutralization-Panel Discussion ..... G. R. Gilliam, Allied Chemical Corp.; Grant Marburger, Spencer Chemical Co.; Philip E. Stone, Virginia- Carolina Chemical Corp.; Frank G. Keenen, E. I. du Pont de Nemours & Co.; N. K. Alfrey, Davison Chemical Division



### Dual Head Sewing Stand

A dual head sewing stand, designed for use in closing open-mouth multiwall bags, has just been announced by Union Bag-Camp Paper Corporation. This latest addition to the Union I&C packaging machinery line accommodates either the 80600E or 80600H sewing head.

In announcing this new machinery development, William F. Jacobi, Union-Camp's director of package engineering, noted that there has been a marked trend recently toward the use of open-mouth multiwall bags by industrial companies. He attributed this both to the packaging economies and tighter closure offered by this style of bag.

"Any company changing over to a sewn open-mouth bagging operation has to train its operator on the proper use of the sewing head," Mr. Jacobi said. "With a single head stand the big problem is thread breakage. This results from either poor machine adjustment or carelessness on the part of the operator. Our new machine is designed to solve this problem. With it, if one sewing head breaks down, the other head can easily be swung into place without any loss of production. This is done by removing a pin on the sewing stand, swinging the pedestal 180 degrees and then replacing the pin."

The dual head sewing stand offers one additional advantage over the single head stand. If both a plain sewn closure and a bound-over tape closure are used on the same production line, one position of the stand can be used for the "E" and the other for the "H" head. This eliminates the necessity of changing heads.

Full information can be obtained by circling number 1 on CF's Information Service Card, page 47.

# FREE LITERATURE ON EQUIPMENT MATERIALS AND SUPPLIES

### Stream Splitters Bulletin

A revised bulletin describing the compact and efficient line of stream splitters has been announced by Sprout, Waldron & Company. In addition to close-up photographs of the unit, Bulletin 137-C has a full table of specifications, dimensions and approximate capacity. The Sprout-Waldron stream splitter is a compact, reliable unit dividing a single stream of dry, free-flowing material up to approximately 1/4" ring size into anywhere from two to eight separate and uniform streams. Copies of Bulletin 137-C are available by circling number 2 on CF's Information Service Card, page 47.

### Heavy Duty Dry Crusher

An improved heavy duty dry crusher or pulverizer has been added to the dry grinding equipment manufactured by Charles Ross & Son Company. This machine, the No. 70-H size 4 Crusher, incorporates a revolving crushing roll inside the hopper to give material a preliminary breaking down before feeding between special hardened steel grinding plates. Clearance of plates and fineness of grind are simply adjusted by handwheel, and when desired fineness is obtained, setting can be locked and material kept feeding through. The crushers feature variable speed drive as standard equipment to deliver best results with maximum production. Indicating gauge insures precise control of fineness of grind. The #70-H size 4 Crusher can be readily dismantled and cleaned within two or three minutes. These machines are inexpensive and simple to operate, and with interchangeable coarse or fine grinding plates are very versatile in operation. Tests can be arranged to show results obtainable on any material. Complete literature is available by circling number 3 on CF's Information Service Card, page 47.

### Batchboard Formula Control

A new and advanced method for automatic batching control has been introduced by Toledo Scale, Division of Toledo Scale Corporation. 'Batchboard' Remocon control is said to afford the latest in proportioning control opportunities through automatic presetting of unlimited numbers of batch formulas.

The Toledo 'Batchboard' brings the advantages of rapid, dependable and convenient formula selection to the Toledo Remocon Batching Systems, and eliminates necessity for manual adjustment of individual weight selectors to obtain the desired quantity of each ingredient in the batch. Toledo Remocon Batching Systems are designed to provide control of entire batching operations from a central remote location. Each "Batchboard" is numbered, representing one specific formula.

For further information on the new Toledo 'Batchboard' Systems, circle number 4 on CF's Information Service Card, page 47.

### Electric-Eye Bulletin

Photomation, Inc. bulletin 522 describes the wide range of application for electric eyes directly to process industries. This bulletin, by means of problem and solution, covers some usual and unusual installations that have been made for instant and accurate monitoring of process flows. It points up techniques used for either gases or liquids and describes standard and special instruments, also drawings of sample tanks and look boxes are included. For bulletin 522, circle number 5 on CF's Information Service Card, page 47.

### Conversion Factors Wall Chart

A reference table for engineers, shop men and executives in wall chart form has been published by Precision Equipment Co. Included are common conversions such as inches to centimeters or watts to H.P. as well as many conversions that are difficult to locate in reference manuals.

For your free Wall Chart of Conversion Factors, circle number 6 on CF's Information Service Card, page 47.



### Bulk Container Dumper

A new Essex Hydro-Dumper is designed especially to handle the latest type bulk material containers. Load capacity is up to three tons. Units are custom built to specification. Dumping heights are up to four feet on floor-level installation. Custom-built stands available for higher-level dumping.

Mobile units are mounted on four heavy-duty, ball bearing casters. Rear casters are swivel type for easier maneuvering. Two positive-acting floor locks hold the dumper in position while loading or dumping. Grooved casters are available for floor track operation. Dumpers are made without casters for permanent type of installations.

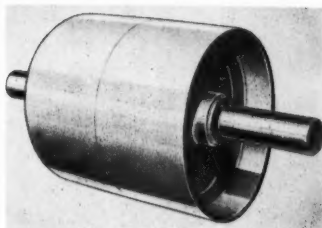
Dumpers are easily loaded by hand or fork truck. Hydraulically operated by lever or push-buttons. For more information circle number 7 on CF's Information Service Card, page 47.

### Pre-Bilt Sectional Conveyor

A practical handbook on the use and selection of standardized Pre-Bilt sectional belt conveyors has just been released by Link-Belt Company. These conveyors, pre-engineered and shop-assembled from matched Link-Belt components, are adaptable to a large proportion of belt conveyor applications and operating conditions. With a new 40-page handbook, Book 2779, selection of the right equipment can be made quickly and easily.

Pre-Bilt conveyors are part of Link-Belt's standard belt conveyor line. They are available in four belt widths of 18, 24, 30 and 36 inches for quick delivery from nine Link-Belt plants located in the United States and Canada.

A total of 22 components and accessories are listed in "Pre-Bilt Sectional Belt Conveyors," Book 2779 and also detailed engineering and selection data. Illustrations show installation applications in a variety of industries and typical layouts. A free copy of Book 2779 can be had by circling number 8 on CF's Information Service Card, page 47.



### Ceramic-Type Magnetic Pulley

A new permanent magnetic pulley being offered by Dings Magnetic Separator Company incorporates a powerful ceramic magnet material called "Ceramax V" to promote fast and continuous separation of tramp iron from deep burdens.

The newly designed Dings Perma-Pulley is of the radial pole, permanent type, said to provide high magnetic strength across the entire width of conveyor belts and optimum removal efficiency at high operating speeds. Stainless steel construction is used to provide all-weather service.

In addition, these other features are cited by the manufacturer:

- no operating cost—no wiring or power is required;
- no maintenance — unit is automatic;
- unit is easily installed;
- high resistance to demagnetization;
- high and prolonged surface strength.

For further details on the new "Ceramax V" Magnetic Pulley, circle number 9 on CF's Information Service Card, page 47.

### PVC Valve, Diaphragm Bulletin

J. E. Lonergan Co. has just released a new bulletin on the company's Chem-Line. It covers the use of polyvinyl chloride in valve trim and diaphragm protectors.

The bulletin includes various applications and technical data concerning the use of PVC in various industries. Copies may be obtained without charge by circling number 10 on CF's Information Service Card, page 47.

### Dual-Purpose Broadcaster

Unique yet simple, a Broad-Caster in a class all by itself has been announced by Larson Machine Co. Every feature is designed for improved operation and performance with a minimum of moving parts to reduce mechanical failures. Either complete assembly can be easily and separately removed for cleaning and servicing. A specially designed feed opening slide connection eliminates the need of disconnecting control parts when removing units. This ruggedly constructed unit has positive, dependable and easy adjusted feed control . . . opening, closing and adjusting is handled from one control within easy reach from tractor seat . . . feed slide control arms provides for adjustment on each side separately.

An exclusive "Jabicator" agitator has been designed to reduce speed of motion so the fan shaft can be used for agitation to maintain a constant even flow without causing violent churning of material. There are no chutes or tubes to clog. Special hopper construction makes it unnecessary to have augers or other devices to convey material.

This Broad-Caster has a large capacity, 14½-15 cubic ft. of displacement, with hopper extensions giving more acres per hour with less stops for filling. Can be used for broadcasting small grains or application of pellet type fertilizer.

For full details circle number 11 on CF's Information Service Card, page 47.



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### Portable Bucket Elevator

A portable bucket elevator, ideal for handling granular materials up to a 12' height has been announced by New London Engineering Company. Powerful electric motor drive, steel buckets bolted to belt, delivery chute, hopper, and casters to suit each application. Available in any height from 6' to 12'. Further information available by circling number 12 on CF's Information Service Card, page 47.

### Lift and Dump Equipment

Dumping equipment that will lift and dump any container is described in a new catalog published by Conveyors and Dumpers, Inc. The brochure has a handy selector chart to facilitate choosing the right equipment for handling loads to 5,000 pounds at dumping heights up to 50 feet.

Four basic models are shown, each available in designs to accommodate drums and barrels, boxes, bags or trucks. The equipment is used in food and chemical processing, metal working and other industries to handle bulk materials and small parts. It permits safe, economic loading of mixers, tanks, kettles, bins, grinders, chutes, conveyors or hoppers.

Copies of the catalog are available by circling number 13 on CF's Information Service Card, page 47.

### Disc Pelletizer-Mixer

Production of a standard line of pelletizing-mixing discs for continuous agglomeration and mixing of a wide variety of fine granular solids has been announced by Dravo Corporation. The discs will be made in four basic sizes: 3-foot 3-inch diameter, 8-foot 6-inch diameter, 12-foot diameter and 16-foot 6-inch diameter. The smallest size discs will be stocked by Dravo for sale or short term rental for use in pilot plant studies.

Developed and designed by Lurgi Company of Frankfurt, Germany, and adapted to American standards, the discs are manufactured and sold in this country by Dravo under an exclusive license agreement with Lurgi.

The discs are equally effective for either pelletizing or mixing. They are used extensively in the steel and mining industries for the agglomeration of ore concentrates. When employed for mixing, the discs are run at substantially higher speeds and thus can handle large volumes of material in relatively short times.

Among materials successfully pelletized in the Dravo Research Center have been common salt, molybdenum trioxide, ammonium sulphate, phosphate rock fines, zinc oxides, aluminum oxides, cement rock, and lime and coal mixtures used in the preparation of calcium carbide.

This experience indicates that most fine materials can be pelletized to any size from 1/16 to 1-1/2 inch. The disc thus affords a means of reclaiming dust, sludges and other fine material that may have been wasted in the past.

Fines are fed onto the disc and water or waste liquors are sprayed on them. The disc's rolling action pelletizes the fine material and automatically classifies the pellets. Because larger pellets roll toward the disc rim while smaller ones stay near the center or under large ones, only the larger pellets are discharged over the rim when the disc is filled. These pellets are not only uniform in size but relatively strong and can withstand a reasonable amount of handling.

In mixing applications the rotation of the disc produces a tumbling,

cascading action in the materials to be processed. The resultant mingling of dry or appropriately moist granular materials approximates the action of conventional batch mixing and blending equipment. However, the disc provides continuous mixing, permitting uninterrupted flow of process materials. Mixing may be done with or without agglomeration of materials in process.

Laboratory tests and performance in actual applications indicate that the disc attains a given homogeneity of mixture with significantly less retention time than conventional batch or continuous mixers. Since retention time is readily controlled by changing the disc's speed of rotation and angle it is possible to employ Dravo's standard sized units to meet a variety of production requirements.

For further details, circle number 14 on CF's Information Service Card, page 47.

### Drag Plate Conveyor

Strong-Scott Mfg. Co. announced the addition of a new drag plate conveyor to their line of materials handling equipment.

There are many features and advantages to the Drag Plate Conveyor, for free flowing material, that are not found in similar type units, according to the manufacturer.

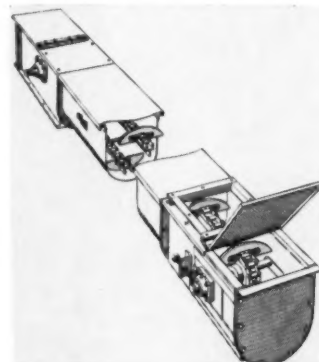
These features include snap-on, dust-tight covers; clam-shell type intermediate discharge gates that fit flush with conveyor trough, eliminating any dead pockets; rubber-hinged door on discharge end for quick, easy inspection, plus modern design and rugged construction.

The unique paddles are made of a long-wearing, specially hardened fibre that resists wear.

It is a self-cleaning conveyor, operating on low horsepower and capable of carrying high capacity loads. This was verified in recent field tests where the 9 inch Drag Plate Conveyor carried more pounds per hour per horsepower than a 12-inch screw type conveyor.

The Strong-Scott Drag Plate Conveyor is available in 9 inch, 12 inch, and 14 inch width models. Length of conveyors made to suit application.

For further information, circle number 15 on CF's Information Service Card, page 47.



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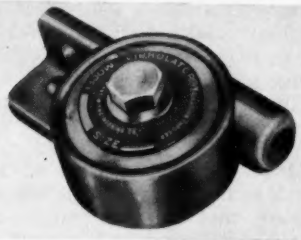
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## New Vibration Inducer

A new vibration inducer of very light weight has been announced by Martin Engineering Company, originators of the 'Vibrolator' line of vibrators. Designated the light-weight BD-10 this redesigned unit now weighs only 4½ ounces yet retains all the power and rugged strength of the 11 ounce predecessor.

The new unit is fitted with a replaceable jet for even greater air economy than the preceding model. Vibration is generated by a rolling ball driven in an orbit on replaceable raceways of hardened high alloy steel precision ground. Operation is safe in explosive atmos-



pheres. Is not harmed by ambient temperatures so high that use of electric vibrators is impossible.

Unit may be obtained in natural aluminum finish at no extra cost and is used where paint or enamel finishes may be a source of contamination for products.

Special lug allows mounting in any position with a single bolt. Used to bring powdered, particulate or granular materials out of hoppers and down chutes, this vibrator will handle bins with 4 cubic foot storage capacity. Silent operation is an inherent characteristic of the new BD-10. Air consumption is only 3 cu. ft. per minute (free air at 80 P.S.I.). Will operate on as little as 5 P.S.I.

For full details and prices, circle number 16 on CF's Information Service Card, page 47.

## Air Compressor Bulletin

An attractive new 24-page bulletin describing the WN-112 stationary air compressor has just been released by Joy Manufacturing Company.

The booklet contains specifications, diagrams, cross section drawings, installation photographs and other pertinent information.

The V-vertical compressor is built for continuous, heavy duty service for pressures to 125 psi with piston displacements from 468 to 974 C.F.M.

For bulletin A-62, circle number 17 on CF's Information Service Card, page 47.

## Lift Truck Booklet

Creative lift truck engineering, new functional styling and improved operating features embodied in a new "Pace-Maker" Series of Fork Lift Trucks manufactured by Towmotor Corporation, are discussed in a colorful new booklet called "The Inside Story," currently available to lift truck users.

One of the most interesting de-

sign-engineering advances outlined in the 24-page Towmotor manual is a new "centralized" system of lift truck controls, based on actual motion studies, which places all steering, shifting and hydraulic control levers within a 6-inch radius—for increased operator efficiency, and greater driver comfort.

For a copy of booklet SP-23, circle number 18 on CF's Information Service Card, page 47.

## Two New Elevators

Two new Bucket Elevators designed for easy access to the interior and easy cleaning have been announced by Bucket Elevator Company. They are: The "V" series Sanitary Conveyor Elevators of the centrifugal discharge type, applicable to a wide range of food products and chemicals, and the "VC" series continuous discharge elevators with overlapping buckets for gentle product handling.

Both feature the exclusive cantilever design which permits disassembly in minutes for easy cleaning. Additional features include seamless buckets, rounded corners and shrouded bolts—available in stainless, galvanized or carbon steel.

For complete descriptive literature, circle number 19 on CF's Information Service Card, page 47.

## Flexible Couplers Bulletin

A recently revised bulletin on roller chain flexible couplings has been published by Chain Belt Company.

Bulletin 597 outlines the advantages that are wanted and needed from a flexible coupling including: simple, all-steel construction that assures long life and maximum service; accommodation of angular and parallel misalignments with minimum backlash; and easy installation or removal.

In addition, the bulletin carries information on how to properly select Rex flexible couplings and illustrates installation and maintenance procedures.

For your free copy of bulletin 597, circle number 20 on CF's Information Service Card, page 47.

## Automatic Chemical Nozzle

The 1190 Automatic Shut-Off Chemical Nozzle is now available from OPW-Jordan. The stainless steel and aluminum nozzle is used for chemical handling wherever bronze is objectionable. Shuts-off automatically when drum, barrel or tank is full. Balanced design for easy handling, hold open notches free operator for other work. Permanent, self-adjusting packing; tamper proof and leak proof without adjustment. Capacity from 17-60 GPM, 1-1/2" sizes, in stock only \$75. For SRBc 36-59 describing and illustrating No. 1190 Chemical Nozzle features, circle number 21 on CF's Information Service Card, page 47.



## Liquid Fertilizer Booklet

A new non-technical booklet giving in some detail a business man's view in the production of liquid fertilizer solutions has been released by the Chemical Plants Division of Barnard & Leas Mfg. Co., Inc.

Reduced to its simplest terms, this multi-color folder gives a summary of this decided trend, the opportunities today and a general "profit picture" in its operation—the chemical formulas and symbols have been removed, and in their place is a pictogram of the process involved with an idea of a plant operation.

Complete information and a copy of this informative booklet is available by circling number 22 on CF's Information Service Card, page 47.

## Aluminum Pipe Fittings

A complete line of aluminum fittings for schedules 10 and 40 pipe is announced by the Speedline Division, Horace T. Potts Co. Alloys include 3003F, 6061-T6, and 6063-T6.

The new line of fittings incorporates the extra length feature familiar to users of Speedline stainless steel fittings. The extra length gives more clearance for welding, simplifies alignment, allows for flanging without welding, and permits a multiple choice of joint at every connection.

Joints may be butt welded or socket welded with aligning connectors. Either serrated flanges or unions may be used where demountable joints are required. Serrations on the I. D. of both the union ferrule and the flange allow either pipe or fitting to be expanded directly into the union or flange insuring a tight leak proof joint without welding.

Other fittings include tees, crosses, 45° and 90° elbows, caps, eccentric and concentric reducers, and stub ends.

For further details, circle number 23 on CF's Information Service Card, page 47.

IF you request literature from a supplier through COMMERCIAL FERTILIZER's Information Service Bureau, and it is not received within a reasonable period of time, please notify this magazine, so that we can follow up on your request.

**Molybdenum** — Several Missouri farmers are growing bigger, healthier soybean plants this year with aid of the trace element molybdenum.

This was the conclusion of a special research team recently sent into the Sikeston area to interview farmers who had treated their seed with Moly-Gro®, a special form of molybdenum designed especially for seed treatment.

The most dramatic variations were seen on Frank Van Horne's farm, just north of Sikeston, where treated beans were an average of six to seven inches higher, and root development was considerably advanced. They plan to have a protein analysis made of the plants and have turned them over to agricultural experts for study. The farmers all agreed to keep a sharp eye on their comparative yields at harvest time.

**Pine Seedlings**—First year results of an experiment testing new planting methods indicate that pine seedlings show the greatest growth and survival if planted mechanically with bare roots and treated with fertilizer. These facts have just been made public in a report by

# RESEARCH RESULTS AND REPORTS

the U.S.D.A. Forest Service at Berkeley, California.

Two new planting techniques were tested in 1958 as part of a continuous program by U.S.D.A. foresters who are looking for ways to plant conifers more efficiently and ensure high seedling survival during the first long dry summer.

**Fall Fertilizer**—"Fertilize your annual rangeland in the fall with nitrogen and phosphate and increase plant growth during the winter months."

This is the recommendation of Pleasanton Plant Materials Center

agronomists at Pleasanton, California. The Pleasanton Center is co-sponsored by the U.S.D.A. and the State of California on a matching fund basis.

"On rangeland the cold period is the critical time of the year," according to the agronomists' report. "Then plant growth is slow and feed is scarce. The application of fertilizer will increase forage production during warmer weather too, but during the winter plants particularly need readily available nutrients from fertilizer when cold winter rains furnish moisture."

These conclusions were based on fertilizer trials conducted over a fifteen-year period at Sunol, California, and on observations of range fertilization demonstrations in Soil Conservation Districts.

**Range Fertilizer**—Results of research at the University of Arizona indicate that ranchers might do well to fertilize their ranges.

The research was done by two graduate students . . . Gary Holt and J. S. Tixier . . . working independently on the Santa Rita Experimental Range of the Forest Service.

Holt tried ammonium phosphate and ammonium nitrate, experimenting with different dosages. He found that the grass nearly doubled with even the smallest amount of fertilizer. And at the same time, he saw cows eating fertilized types of grass that they would not touch when not fertilized.

Tixier, using ammonium phosphate-sulfate, watched the fertilized grasses grow taller and said they were also greener and leafier.

It was also observed that the fertilized grass had a longer green growing season of several weeks which offers an important advantage.

At this point, the UA scientists aren't advising the ranchers to hire an airplane and start spreading fertilizer, but they do say the possibility looks promising and ought to be watched.

**Cabbage Yields** — The average yields of marketable cabbage grown for processing were increased better than four tons to the acre by well-timed irrigation in tests covering four growing seasons at Cornell's New York State Experiment Station at Geneva. The studies are being continued.

**Radioisotope Absorption** — Plant scientists at the University of Minnesota will soon begin a study of

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absorption of strontium-90 and other radioisotopes by farm crops.

The study will be part of a project financed by a recent grant of \$32,890 from the Atomic Energy Commission. It will be directed by A. J. Linck and Thor Kommedahl, both members of the department of plant pathology and botany on the St. Paul campus. Researcher T. W. Sudia will be immediately in charge of the field work.

**Glass Fertilizer**—Fertilizers made from glass frits are now being used in Florida to prevent rapid leaching from the soil, according to H. W. Winsor, assistant chemist with the Florida Agricultural Experiment Station.

According to Winsor, 25 to 50 pounds of the frit per acre has produced excellent results. Plants bloom freely, set seed heavily, and produce larger yields of higher quality plants when glass fertilizer is incorporated into usual fertilizer mix.

**Superphosphate**—Annual banded applications of superphosphate at 10 to 20 pounds of  $P_2O_5$  per acre proved more successful than initial broadcast applications of phosphate rock at 320 pounds of  $P_2O_5$  per acre in field experiments carried out over an eight-year period in Michigan.

Rock phosphate did not increase yields of corn even though significant increases were obtained with superphosphate. Small grains exhibited some response to rock phosphate but less than to superphosphate, and generally, to a non-significant degree. Alfalfa-brome hay was more responsive than the other crops to rock phosphate, particularly second-year hay, but the response was no greater than to superphosphate.

In terms of net increase in yields of small gains per pound of applied  $P_2O_5$ , superphosphate was 15 times more effective than rock phosphate in boosting yield. On first-year hay, superphosphate was 12 times more effective and on second-year hay, eight times more effective than rock phosphate.

**Peat Soils**—Soil scientist Rouse Farnham at the University of Minnesota, says that, handled properly, peat can nourish as lush a stand of hay or pasture as any other soil. It would pay many a farmer to shift from drouthy soils and pastures to peat land on the farm that may do much better, he says.

Farnham and workers at the

North Central Experiment station at Grand Rapids this spring harvested 2.7 tons of alsike clover per acre on peat. He seeded these plots in 1958, after first laying down 10 pounds nitrogen, 30 pounds phosphate and 90 pounds potash per acre. Along with the fertilizer, the soil got a trace mineral mixture of copper, calcium, manganese, molybdenum and iron. The legumes got some more phosphate and potash this spring, and non-legumes also received 50 pounds nitrogen per acre.

**Christmas Tree** feeding is the chosen subject of Hirosław Czepowski, Ukainian candidate for PhD at Rutgers. He came to America with a background of forestry from an area where every stick is treasured. So it was logical for him to choose this subject, and the Rutgers forestry department calls him a "rare find." So he is busy raising Norway Spruce on test plots, to see what plant food will do toward, among other things, making the tree hold its needles longer.



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# WHEN FARM LAND GOES SUBURBAN

## WHAT HAPPENS TO THE FARM STORE?

What happens to the farm supply store when the surrounding farmlands become city suburbs? That was the question which faced Neeld-Gordon Co. when the influx of new residents and retired people pushed the urban area of St. Petersburg, Florida far beyond the old city perimeter.

The business, founded in 1919 on the outskirts of the Florida west coast city, grew steadily through its early years and survived the land boom and bust of the twenties. Farmers, and others driven back to the land by the depression, needed fertilizer and supplies to make the most of the Sunshine State's long growing season.

Through the years a line of hardware and paints was added, and the volume improved steadily. The city grew steadily, too, with many oldsters attracted by a climate which a survey had pronounced the healthiest in the U. S. Tampa, thriving sister city across the bay, was also bulging at the seams, and pushing the farmers further and further from the bay area.

Cattle and poultry feed had been the mainstay of Neeld-Gordon's business as a greater population demanded more milk, eggs, beef and poultry. This was the situation in 1954 when the present owners acquired the business from B. C. Neeld, its founder. The partners, Harold Dawson and Howard Williams, came from Pennsylvania where they had been partners in a coal business.

The new owners, seeing an abundance of green thumbs in the bustling resort center and retirement capital of 140,000 residents, began pushing a line of garden supplies, with emphasis on fertilizer. But they had a problem: how to attract customers



Neeld-Gordon's loading dock serves as front porch and display area. Customers park right at the door, enter on steps or ramp at right. Large opening at extreme left is access door to warehouse area, and trucks load and unload at this position.

to an out-of-the-way location. The store was located in a small industrial section on a spur track of the Atlantic Coast Line Railroad, away from the main thoroughfares in a quiet residential neighborhood three miles from downtown St. Petersburg. Prohibitive land and construction costs prevented any consideration of moving the business to a location where it would be exposed to a volume of drive-past traffic.

The partners began by doing a lot of newspaper advertising, and also used the newcomers' Welcome Wagon service for about a year. They found both of these media good, but costly, means of attracting new customers.

A couple of years ago, they hit on the idea of publishing a monthly garden news sheet. Their original mailing list was a list of dog owners in St. Petersburg. After the first few issues, word got around and people began asking to be placed on the mailing list. Now a large pad in the store invites customers and "lookers" to sign up for the free publication. Circulation has topped the 3500 mark recently.

The news sheet is written by

the garden supply store employees, and mimeographed on both sides of an 8½ x 14-inch sheet by a local print shop. It is mailed at bulk rates of 1.8¢ per piece. The entire cost of putting out the publication is about \$150 a month, including printing, and the owners have found that it is worth far more than that.

Since beginning the news sheet, Williams and Dawson have discontinued the Welcome Wagon service, and have sharply curtailed their use of newspaper space.

The monthly letter is informal and chatty, and gives the firm a good opportunity to tell customers and potential customers what, when and how to fertilize. It has also vastly improved sales of insecticides, fungicides, herbicides, plants and seeds, through frequent 'tips' on what to plant and when to give it what kind of attention.

The partners have maintained a friendly, country-store atmosphere at the garden center. This encourages customers to stay awhile and talk about their lawn and garden problems, or just to browse in the endless array of merchandise.

An old-fashioned customer service

Left: Owners Harold Dawson and Howard Williams pace the casual, friendly atmosphere of the store.



Right: Harold Dawson enlists aid of Tobey Newcomb (center), district manager for O. M. Scott & Sons, to solve a customer's lawn problem.





they have been careful to retain is the old 'farm board' . . . a big black-board with chalk handy so customers can write down things they want to sell, buy or swap. This is kept at the front entrance.

"We've had folks drive up to our front, park and read the farm board, then drive away," the partners say, but they don't mind, because they believe that when these people have occasion to visit a garden shop, they will come back to Neeld-Gordon. "Sort of a homing instinct, like a pigeon," Dawson suggests.

Like most garden centers Neeld-Gordon gets many telephone calls each day for garden-lawn information. "We're always glad to give this free service," Williams says, "no matter how busy we may be. You have to cater to the customer if you want to be successful. And Neeld-Gordon is successful enough to keep eight employees and three delivery vehicles busy throughout the year.

There is no 'best season' at Neeld-Gordon. "We're busy all the time," says Howard Williams with satisfaction. "Early spring and early summer we sell garden supplies. In the summer it's insecticides that keep our cash register ringing. In the fall it's lawn fertilizers that constitute a lot of our business."

Many of the firm's customers have been stepped-up to a three-times a year fertilizer application, which has added considerable volume to plant food sales. Fertilizer accounted for \$45,000 of the firm's \$156,000 sales in 1958, and brought in more than 30% of the gross profit. The shop moves upwards of 400 tons of plant foods annually, about two thirds of which is chemical mixtures and the remainder organics of one sort or another. Landscapers and professional yard-care men receive a discount on all goods.

Biggest seller at the center is their own 'Estate' brand, put up by Gulf Fertilizer Company at nearby Tampa and trucked to the outlet. Most popular grades of their brand are relatively low-analysis mixtures, with 6-8-6 and 4-6-8 in the greatest demand.

Dawson and Williams don't try to push a buyer toward something else, but endeavor to have on hand whatever the customers want. As a result, they sell a wide variety of brands.

Milorganite is in good demand among their clientele, as many of the purchasers are retired midwesterners with whom this material is established. In the larger bag sizes, Scott's products (O. M. Scott & Sons

Co., Marysville, Ohio) also have considerable demand.

In addition, other 'regulars' are Swift & Company's 'Vigoro'; American Agricultural Chemical Company's 'Agrico' specialties; 'Gro-Tone' (Wilson & Toomer Fertilizer

Co.); Reliance 'Rose Special' and 'Azalea and Camellia Special' (Reliance Fertilizer Co., Savannah, Ga); du Pont's 'Uramite' and 'NuGreen'; 'Nitro-Matic' (Southern Agricultural Insecticides, Inc., Palmetto, Fla.); and the regular line of Gulf ferti-

1. Display of Scott's Turf Builder products is just inside front door. Bag of "Nitro Matic" urea fertilizer and bag of dog food are waiting for customer's car to be backed up to loading platform.
2. Display fixture directly across from sales counter offers choice of rose fertilizer or azalea and camellia special, both products of Reliance Fertilizer Co., Savannah, Ga.
3. Rack at end of counter features wide choice of Wilson & Toomer's Gro-Tone specialty products; most of these were produced at Wilson & Toomer's Peninsular Fertilizer Division in nearby Tampa.
4. Space under a display counter along main aisle houses three Agrico specialties, also Cyanamid and plastic bags of dolomite.
5. Tablet alongside cash register is where customers sign up to be placed on mailing list for Neeld-Gordon's garden news letter.
6. Counter display above bulletin board offers to obtain free answers to lawn questions, plus free subscription to 'Lawn Care' magazine.
7. Patrons are free to peruse well-stocked shelves behind sales counter. Wide aisle permits easy access.
8. Shelf stock is kept at a minimum of each container, with replacements made frequently from stock room when clerks are not busy.
9. Straight materials and mixed grades not frequently called for are kept in hoppers outside stock room, weighed out as ordered.
10. Specialty product and under-50-pound bags are stored on shelves in stockroom.
11. Larger bags are stacked at angle toward wall in warehouse.



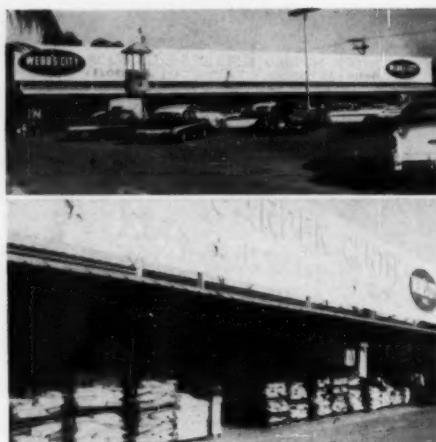
lizers from the firm which mixes Neeld-Gordon's 'Estate' product.

Their soluble specialty line includes 'Plantabbs' (made for Hygro Corp., Baltimore), 'HiPonex' (Hydroponic Chemical Co., Inc., Copley, Ohio), 'Cypress Gardens' (Chatelier Laboratories, St. Petersburg), and 'Nutri-Sol' (Nutri-Sol Chemical Co., Tampa, Fla.).

Neeld-Gordon, despite emphasis on the fertilizer and garden supplies trade, never overlooks a chance to capitalize on an opportunity in the feed business. Besides a regular clientele for dry dog food (a pet supplies line helps attract these), the firm makes substantial sales to dog trainers who bring their sleek greyhounds to St. Petersburg's track for the racing season. In addition, the firm finds an occasional opportunity—as they did during the unusual Florida freeze of 1957-58—to sell quantities of feed to cattle owners whose grazing lands are damaged or temporarily out of production.

But fertilizer and garden supplies remain the bulk of the partners' business, and they are considering discontinuing paints and many hardware items to provide additional display space for the main profit lines.

Williams and Dawson have carved out a profitable market for them-

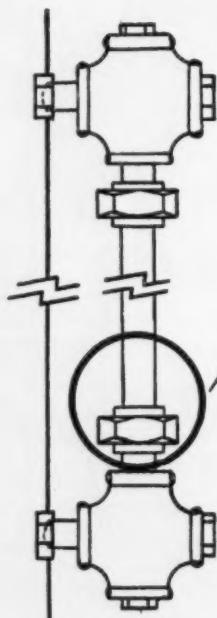


Among Neeld-Gordon's local competition is highly-rated Webb City, "the World's Largest Drug Store." Spacious parking lot outside Webb City's Garden Center accommodates hundreds of cars (upper left). Photo at lower left shows drive-through loading shed adjacent to parking lot where palletized bags of fertilizer can be dropped directly into trunk of customer's car. Photo at right shows part of Webb City's jam-packed fertilizer warehouse, where fork lifts wheel goods in and out.

selves despite intense local competition for the lawn and garden supply business. Among their competitors is hard-selling Webb's City, which advertises itself as the 'world's largest drug store.' The 'drug store' is actually a huge combination merchandising operation carrying almost endless varieties of merchandise lines. It operates a bustling downtown garden center,

set up on the supermarket shopping principle, which shoves into the public's hands a tremendous volume of the goods that Neeld-Gordon also sells.

But Harold Dawson and Howard Williams aren't worried . . . experience has proved that there are still plenty of customers who like the casual, friendly, personal atmosphere of their shop.



## TULL designed to save you money NITROGEN SOLUTION SYSTEM Gauge Glass Fixtures

Simple, easy to clean, inexpensive

The combination of a Tullco modified union and rubber bulb gasket guarantees a leak-proof connection.

We have the entire system in stock—buy as a complete unit or in part.

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JACKSONVILLE

MIAMI

TAMPA

# The International Scene

## ARGENTINA

### Consumption Unchanged

Fertilizer Consumption in Argentina changed little between 1957 and 1958 crop years. Cost of fertilizers was high in relation to farm product prices. But there is a definite trend toward growing use of the higher analysis plant foods.

## CHILE

### Credit to Expand Production

A credit increase of \$4,000,000 will help advance the Chilean program to produce more nitrates. This new credit is in addition to the \$16,000,000 credit already authorized to Anglo-Lautaro Nitrate by the Export-Import Bank.

## CYPRUS

### Removes Import Ban

Cyprus imposed on December 31, 1958 a ban on the importing of potassium nitrate, ammonium nitrate, sodium nitrate, potassium chlorate and sodium. This has now been removed.

## EAST GERMANY

### World's Top Potash Exporter

German Democratic Republic is reported to be today the world's largest exporter of potash, with foreign sales to 43 different countries, totalling a million tons in 1958. Since 1950, output of potash has risen 25% to the present 1,500,000 tons.

## INDIA

### Plant in Each State

With the exception of two, every State in India may have a fertilizer plant larger than Sindri, if the proposed 5 year plan for fertilizer expansion is carried out. The aim is for 5,000,000 tons of ammonium sulphate, or 1,000,000 tons in terms of N, annually.

## KOREA

### Needs 967,918 Tons

The Agriculture-Forestry Ministry has figured that the total fertilizer need for the crop year which began the first of last month will be 967,918 tons, of which Choongjoo will supply 180,000 tons when it goes into full operation late this year.

## UNITED KINGDOM

### Subsidies Unchanged

The United Kingdom fertilizer subsidy program continues almost unchanged for another year, beginning July 1, except that the contribution for sulphate of ammonia is raised in proportion to the guaranteed increase of N content.

### Stauffer and Kali-Chemie Form Joint Venture

Stauffer Chemical Company and Kali-Chemie A. G. are concluding an agreement to form a joint company to produce and market a special insoluble sulphur in Western

Europe. The company, to be known as Kali-Chemie-Stauffer G.M.B.H., plans to build a plant at Hanover, Germany which, it is anticipated, will be in production by January, 1960. Output of the new facilities will be marketed, under the Crystex tradename, by Kali-Chemie A.G.

Kali-Chemie A. G., a major manufacturer of chemicals, has 15 plants in Western Germany. It produces a range of heavy chemicals, fertilizers, catalysts and pharmaceuticals. Stauffer, the largest U.S. producer of processed sulphurs, manufactures some 400 industrial and agricultural chemicals and operates 50 plants in the U. S. A. It also has interests in chemical manufacturing enterprises in Canada, Mexico, Australia, Argentina, Germany and Spain.

### Road Travel Cost Reaches All Time High

Salesmen on the road in motor cars are costing their concerns more than ever before, according to the head of Wheels, Inc., one of the nation's largest auto fleet leasing firms. They made a national study, and found that more companies paid 9c a mile than any other rate . . . 36% of them. 23% of the companies paid 8c. 16% of the companies paid more than 9c. And only two companies in the study paid as little as 6.5c.

Salesmen who average more than 18,000 miles a year over the road are generally paid 8 or 9c. Those operating primarily in cities are frequently paid 10 and 11c.

# STEDMAN

## Fertilizer Plant EQUIPMENT

All Steel Self-Contained Fertilizer Mixing and Bagging Units  
Complete Granulating Plants, Batch Mixers—Dry Batching—Pan Mixers—Wet Mixing

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Dust Weigh Hoppers  
Vibrating Screens  
Acid Weigh Scales  
Belt Conveyors—Stationary and Shuttle Types  
Batching Systems  
Bucket Elevators  
Hoppers and Chute:





# MEETINGS . . . . .

## Canadians Hold 14th Annual Convention

The 14th Annual Convention of the Canadian Fertilizer Association was held last month and an interesting list of speakers was on the agenda: Dr. A. C. Richer, Department of Agronomy, Penn State University; Dr. C. H. Goulden, assistant deputy minister (Research), Canada Department of Agriculture, Central Experimental Farm, Ottawa; Francis A. Raymaley, forage specialist, American Cyanamid Company, New York; Dr. D. Hopper, Department of Agriculture, Ontario Agricultural College, Guelph, Ontario.

Larry Henderson, the well-known C.B.C. commentator, spoke on his recent trip to Russia.

## Oregon Meeting On Agro-Forestry

The success of the first Agro-Forestry meeting at Pack Forest, Washington, last fall has brought about many requests for a continuance of this type of a program, where agronomists from college and industry can get together with foresters to exchange ideas on management and fertilization.

The meeting this year will be held at the Pringle Falls Experimental Forest in the heart of the Ponderosa Pine Area September 29-30. There will be an interesting program to discuss the management of the forests on these wind-blown pumice soils. Data on the economics of Douglas fir tree fertilization, and many other interesting topics will also be discussed.

## ACS Slates Soil Testing and Fertilizer Technology

Recent advances in fertilizer technology and soil testing will be discussed by the American Chemical Society's Division of Fertilizer and Soil Chemistry during the Society's 136th national meeting which opens in Atlantic City, N. J., September 13.

Thirty-three technical reports by authorities in the fertilizer field have been scheduled, beginning Monday afternoon, September 14, and continuing through Thursday morning. There will be a symposium on soil testing on Tuesday, September 15. All sessions of the division will be held in the Haddon Hall Hotel.

A highlight of the division program will be a luncheon address on Tuesday by Bruce D. Cloaninger, secretary-treasurer of the Association of American Fertilizer Control Officials. His topic will be "The Consistency of Change".

M. D. Sanders of Swift & Company is chairman of the Division of Fertilizer and Soil Chemistry, T. P. Hignett of the Tennessee Valley Authority is vice-chairman and J. O. Hardesty of the United States Department of Agriculture is secretary. The group is one of 21 ACS divisions which will sponsor scientific and technical reports at the meeting.

## Far West Safety School

A school on accident prevention for fertilizer plant personnel is slated for October 29 and 30 at Fresno, California, it was announced

by Dr. Richard B. Bahme, National Plant Food Institute Western Regional Director.

"All fertilizer companies doing business in the Far West are invited to send their plant personnel to the two-day safety school," Dr. Bahme said. This second safety school to be held in the Far West is sponsored by the Fertilizer Section of the National Safety Council in cooperation with the National Plant Food Institute.

## Iowa Selected for Promotion Workshop

Iowa has been chosen as the site for one of two fertilizer promotion workshops that will be sponsored by National Plant Food Institute during 1959-60. Location of the other workshop has not yet been finally determined, but an announcement is expected in the near future.

The Iowa workshop is scheduled for December 10, and probably will be held either at Waterloo or Des Moines. It will be open to salesmen and other personnel of Institute member companies only and any dealers that they may wish to invite.

Program plans are being developed in consultation with Institute members doing business in Iowa.

## NPFI Traffic Committee

A meeting of the Traffic Committee of the National Plant Food Institute will be held on Wednesday and Thursday, October 7-8, 1959 at Houston, Texas, Chairman John S. Carlson, general traffic manager for Stauffer Chemical Company, New York City, has announced.

The business meeting of the committee is scheduled to be held in the Neches Room, Rice Hotel, Houston, on October 7, beginning at 9:30 a.m., and the next day, the

## CONTROL OFFICIALS SET PROGRAM

October 15-16, Shoreham Hotel, Washington, D. C.

8:00 p.m.—Thursday—States Relations Committee

8:30-9:30 a.m.—Friday—Registration

Reading of Minutes

Report of Secretary-Treasurer ..... B. D. Cloaninger, Clemson, S. C.

Announcements and Appointments of Committees

Roll Call by States

Presidential Address ..... Dr. F. W. Quackenbush, Lafayette, Ind.

In-Plant Shrinkage ..... Dale C. Kieffer, Smith-Douglass Co., Inc., Norfolk, Va.

Some Observations on the NPFI ..... Dr. A. J. Duncan, Chemical Control Johns Hopkins University, Research Project Baltimore, Md.

I. B. M. Equipment for: Tonnage Report .... M. B. Rowe, Virginia Dept. of Agriculture, Richmond, Va.

Analytical Reports ..... R. C. Crooks, Florida Dept. of Agriculture, Tallahassee, Fla.

Summary of State Fertilizer ..... Dr. Stacy B. Randle, Laws New Brunswick, N. J.

Summary of Tonnage Reports ..... Bruce Poundstone, Lexington, Ky.

Reports of Investigators and Committee Reports

Afternoon Session devoted principally to reports of investigators and committees.



## Blaw-Knox Clamshell Buckets cut costs, stop leakage in Chemical Plant applications



3½-cubic-yard Blaw-Knox Clamshell Bucket handles phosphate rock and finished superphosphate products at the Curtis Bay Plant of W. R. Grace & Co., Davison Chemical Division. Complete engineering information on this type of bucket is contained in Bulletin 2378-R-1. Write for a copy today.

**BLAW-KNOX**

Blaw-Knox Clamshell Buckets cut costs by preventing contamination of materials; at the same time, have excellent digging capabilities in handling granular chemicals.

These buckets are especially designed and built with super-tight-fitting lips and drop forged, chrome nickel teeth. Easily attached to bridge type cranes, these buckets are used in a large number of storage and rehandling operations.

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VARIETY OF  
GRADES AND  
STRENGTHS**



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ALL YEAR 'ROUND**

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**The Quaker Oats Company**  
**CHEMICALS DIVISION**

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committee will be guests of the Texas Gulf Sulphur Company for a trip to view the sulfur mining and refining facilities of the company at Newgulf.

R. V. (Bob) Peabody, general traffic manager of Smith-Douglass Company, Norfolk, Va., is vice chairman of the traffic committee and Paul T. Truitt, executive vice president of the Institute is secretary.

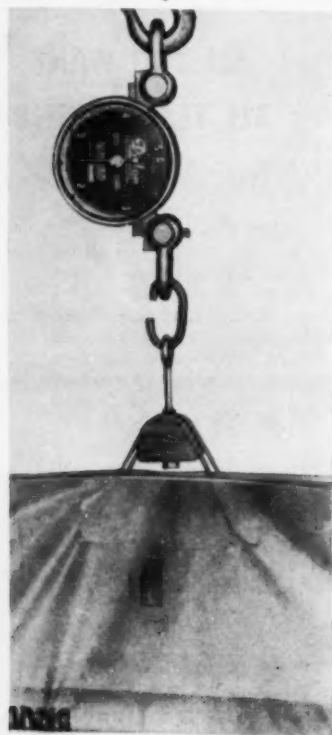
## 22 More Counties Added to Ga. Program

Twenty-two more counties have been added to the list of those enrolled in Georgia's intensified soil fertility program. This brings to 52 the number of counties included in the program which was launched two years ago.

Organization phases of the project now are underway in these counties, with kick-off meetings slated for this fall. Work in the new counties will be patterned after that carried out in other areas which successfully pioneered this type of project.

J. R. Johnson, extension agronomist, said that the soil fertility projects are only a part of the total agronomy program in Georgia. Emphasis, he added, will be placed on all phases of crop production in urging growers to reach this goal of \$200 million.

Designed to lessen the load of carrying bulk packaged products in 25 lb., 40 lb. and 50 lb. multiwalls, the Hudson Pulp & Paper Corp., Multiwall Department, is currently producing bags with side carrying handles. The unique construction of the handles provides for a pull of up to 250 lbs. and has been thoroughly tested at the distribution and consumer level. Inquiries for literature and technical service assistance may be obtained by writing the Multiwall Dept., Hudson Pulp & Paper Corp., 477 Madison Avenue, New York 22, N. Y.



## Industry Meeting Calendar

DATE	EVENT	LOCATION	CITY
Sept. 3-4	Fertilizer Salesmen's School	N. C. State College Union	Raleigh, N. C.
Sept. 14-17	Fertilizer Division ACS	Haddon Hall	Atlantic City, N. J.
Sept. 24-25	Northeastern Fertilizer Conference	Biltmore Hotel	New York City
Sept. 30-Oct. 1	Southeastern Fertilizer Conference	Biltmore Hotel	Atlanta, Ga.
Oct. 14-16	Pacific N.W. Fertilizer Convention	Chinook Hotel	Yakima, Wash.
Oct. 15	Chemical Control Conference	Shoreham Hotel	Washington, D. C.
Oct. 15-16	Fertilizer Control Officials	Shoreham Hotel	Washington, D. C.
Oct. 19-20	Fertilizer Safety Section	LaSalle Hotel	Chicago, Ill.
Nov. 4-6	Fertilizer Industry Round Table	Mayflower Hotel	Washington, D. C.
Nov. 5-6	Far West Safety School	Hacienda Hotel	Fresno, Calif.
Nov. 8-10	Nat'l. Fertilizer Solutions Assn.	Statler Hilton	St. Louis, Mo.
Nov. 9-11	California Fertilizer Association	Fairmont Hotel	San Francisco, Calif.
Nov. 12-13	Southwestern Safety School	Tropicana Motor Hotel	Pasadena, Texas

## —of This and That . . . .

An interesting parallel on the growth of cooperatives appeared in a recent issue of *The Cooperative Consumer* in an article about Alvin Schnack, one of four men named to the Iowa Master Farmer list by *Wallaces Farmer* magazine. The *Consumer* captioned this item 'Investment in Co-op Earns 17,278% Return':

"In 1941, Alvin Schnack joined the Farm Service Cooperative of Harlan, Ia., by buying a five-dollar share in the association.

"Since then, he has invested no more money in the co-op. He's simply done some of his buying there—paying what he would have paid for the 'same goods bought from businesses other than cooperatives.

"Just for doing business at the co-op, Schnack has earned \$863.94 in patronage refunds. That's a 17,278% return on his original investment.

"And more than \$500 of that return has been paid to him in cash. The rest came back as preferred shares of stock in the association."

Virginia-Carolina Chemical sent eight members of its fertilizer sales organization and their wives to Bermuda for an expense-paid week's vacation August 22. The eight—four district managers and four salesmen—were winners in the company's "Showboat" sales contest started last January. Points were awarded for each ton of mixed fertilizer sold.

Winning managers were E. Exum Griffin, Estherville, Iowa; C. D. Griffin, Norfolk, Virginia; P. E. Bradley, Memphis, Tennessee; and W. D. Barton, Montgomery, Alabama. Winning salesmen were Stanley K. Thomsen, Estherville; George M. Davis, Jr., Norfolk; Clyde Washburn, Jr., Memphis; and W. C. Edge, Birmingham, Alabama.

"You have an outer space problem, too . . ." is the clever caption on a new piece of Bemis Bag promotional material. The message, printed across the face of a picture of a bag, continues "THIS outer space." The mailing piece, in few words, goes on to point out how important the bag exterior is in selling the customer what's on the inside.

One billion a year is the sales goal of Jiffy-Pot of Oslo, Norway, makers of nutrient-impregnated cultivation pots. The Oslo plant turned out 300 million pots last year, 110 million of which were exported to the U. S. American advance orders for next year already total 250 million units. Jiffy-Pot plans to add production facilities abroad, too . . . a new plant in Denmark is slated to produce another 300 million units annually, and a similar plant in the U. S. will be in production next summer. The Jiffy Pot, a transplanting pot which decomposes in the soil, is made up of 70% peat, 27% pulp, and 3% fertilizer.

Sam Tisdale, NPFI's Southeastern regional director, and Bill Bishop, Tennessee Extension agronomist, had a narrow escape August 19 when Dr. Tisdale's car was rammed from behind in downtown Atlanta by a tractor-trailer on which the brakes had failed. Impact of the collision piled Dr. Tisdale's car into a line of four other vehicles waiting at a traffic light. The repair shop declared Dr. Tisdale's car a 'complete loss,' but both the occupants escaped with no apparent injuries except sore necks and headaches.

## GRIFF'S "CADILLAC" SPEECH

Ten years ago, C. S. Griffith of V-C made a talk about costs, which has become known as the Cadillac speech, and quoted in many a cost conference with the supervisory people of many a fertilizer plant across the country. The main point is that equipment is a big factor in operating costs, and a fine piece of equipment, like a tractor shovel, deserves the same care you would give a Cadillac.

As Griff put it, there are many ways to control costs—but first we must believe in it, follow it through, get it done in every phase of our operations. We must direct all our thoughts and all our activities toward this goal—for after all, the control of costs is a major part of the control of profit.

He stressed advance planning, citing a superintendent who has a very good record and who, when confronted with a problem, does not have to flounder around, because he has things thought out in advance.

Tongue in cheek, Griff said he had been in a lot of competitive plants and looked at their equipment. "And, believe me," he said, "we are in excellent shape from an

equipment standpoint."

But to get specific about the Griffith recommendations, good then, more important now because of the cost-profit squeeze: It is the equipment we have which controls our costs, and the care with which we operate and maintain it. In order to lower operating costs we must use it to the best advantage.

Don't expect a tractor-shovel, for example, to operate every day for 8 hours a day without the best mechanical attention. These machines deserve the same care you would give your own automobile. They should be cleaned, tightened, properly lubricated and thoroughly inspected after each day's work.

Ample repair parts should be kept on hand, and this applies to other plant equipment if your plant is to operate with the efficiency required by the need for low operating costs. Every piece of equipment in the plant should be in such shape that it will go right to work the next morning, and keep operating during the day's run.

Good equipment requires good supervision, and that calls for good training of the supervisory people

in the care of mechanical equipment, so they can properly direct the operation at all points of potential breakdown.

This applies to the overall operation, too. Teach your people to watch closely the materials moving to you, and plan your basing operations accordingly. The more thought you give it, the more closely you can match your basing operations to your incoming material schedules. And this helps efficiency, which in turn helps keep costs down.

Teach your supervisory people to be cost conscious in every phase of the operation whether it be shipping, dry basing or cleaning a drainage ditch. Teach them to stay with the crew. Day laborers won't do much unless the boss is around, and not much then unless properly supervised.

Idle labor is the king-sized headache. By keeping in close touch with Sales, Production can calculate the labor need, and hold it down to a proper level. It is often possible, when a sudden order comes along, to shift men from one operation to another, thus keeping down the overall payroll.

Boil it down to one sentence: High costs can be overcome with good, active, first class supervision!



## NATIONAL CAL-MAG OXIDES NOW IN TWO SCREEN SIZES

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Curing factors in the preparation of effective  
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HYDRATED  
LIME (165 TNP)  
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KILN DRIED RAW  
DOLOMITE  
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## CF Staff—Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control Officials and Tabulated by COMMERCIAL FERTILIZER Staff

STATE	July		June		April-June Quarter		January-June		July-December		YEAR (July-June)	
	1959	1958	1959	1958	1959	1958	1959	1958	1958	1957	1958-59	1957-58
Alabama	-----	14,162*	69,909	64,827	549,564	487,441	846,309	734,077	199,265	172,721	1,045,574	906,798
Arkansas	-----	20,612*	37,569	30,048	175,592	150,970	289,365	226,889	64,092	62,752	353,457	289,641
Georgia	80,725	68,610	231,074	233,786	955,705	798,310	1,130,998	944,618	294,751	269,529	1,425,749	1,214,147
Kentucky	-----	5,470*	26,415	40,544	307,715	290,423	483,821	435,023	99,460	88,771	265,794	252,601
Louisiana	13,972	10,214	21,173	26,536	122,382	120,744	201,642	188,409	64,152	64,192	583,281	523,794
Missouri	-----	16,393*	59,592	48,925	390,700	333,851	556,075	420,615	370,036	335,312	926,111	755,927
N. Carolina	-----	22,354*	95,713	114,084	842,771	823,676	1,468,704	1,261,685	228,055	199,446	1,696,759	1,461,131
Oklahoma	-----	5,689*	8,627	6,055	38,937	35,804	64,738	55,964	68,848	51,436	133,586	107,400
S. Carolina	12,632	18,064	47,518	53,663	370,628	328,955	756,100	615,733	134,202	116,874	890,302	732,607
Tennessee	15,644	14,400	28,621	44,938	292,705	223,068	443,602	307,182	127,116	135,717	570,718	442,899
Texas	36,002	32,186	66,121	98,263	226,767	288,802	441,851	452,327	222,800	213,801	664,651	666,128
California	(reports compiled quarterly)				-----	426,032*	-----	679,577*	450,767	441,969	-----	1,123,235*
Virginia	(reports compiled quarterly)				303,300	331,222	618,965	549,773	160,178	140,783	779,143	690,556
Indiana	(reports compiled semi-annually)				-----	-----	856,316	795,506	316,341	284,959	1,172,657	1,080,465
New Hampshire	(reports compiled semi-annually)				-----	-----	-----	16,053*	4,746	3,966	-----	20,019*
Washington	(reports compiled semi-annually)				-----	-----	-----	158,286*	75,350	77,498	-----	235,784*
<b>TOTAL</b>	<b>158,975</b>	<b>143,474</b>	<b>692,332</b>	<b>761,769</b>	<b>4,578,766</b>	<b>4,213,266</b>	<b>8,158,486</b>	<b>6,987,801</b>	<b>2,880,159</b>	<b>2,659,726</b>	<b>10,507,782</b>	<b>9,124,094</b>

----- (not yet reported)

\* Omitted from column total to allow comparison with same period of current year.

## STATE NEWS . . . . .

### Arizona

Sale of commercial fertilizer in Arizona jumped nearly 20,000 tons during 1958 as compared with the previous year.

Last year's consumption hit 191,375 tons while the year before the figure stood at 171,408 tons. This includes both mixed goods and materials.

Mixed fertilizer use, both liquid and dry, was up a little over 12,000 tons while materials consumption accounted for the balance of the increase.

### Illinois

A bill creating a feed and fertilizer laws commission in Illinois was signed by the governor recently.

The bill calls for the Commission to make a thorough study and survey of all laws in Illinois dealing with the feed and fertilizer businesses. The Commission also will examine all phases of regulations imposed with regard to such laws and their enforcement.

The group's finding and recom-

mendations are to be submitted for legislative action to the Seventy-Second General Assembly no later than Mar. 1, 1961.

### Kentucky

Recommended 1960 fertilizer ratios and grades suggest dropping the 0-2-1 ratio; adding to the list a 1-3-0 ratio, minimum grade of 8-24-0; and in ratio 1-4-4, establishing a 4-16-16 minimum grade instead of 3-12-12.

In addition, the recommended ratios for 1960, with the minimum grade in parenthesis, are: 0-1-2 (0-10-20); 0-1-1 (0-20-20); 1-1-1 (10-10-10); 1-1-3 (6-6-18); 1-2-2 (5-10-10); 1-2-3 (5-10-15); 1-3-2 (4-12-8).

### Oregon

Recent amendments to the Oregon Fertilizer Law provide that the Director of Agriculture set inspection fees not higher than 10 cents per ton, and that the Department name the elements that have fertilizer value.

Elements under consideration include magnesium, calcium, sulphur,

boron, copper, iron, manganese, molybdenum and zinc. It is felt that the guarantee for iron and calcium in a mixed fertilizer might be of little significance and guarantees for these elements should be restricted to the agricultural mineral section of the law. Guarantees for these elements should be expressed as the elemental, rather than the oxide or salt form. These proposals are tentative.

### Washington

Washington Department of Agriculture plans a meeting with fertilizer manufacturers and prime suppliers to discuss methods of collecting tonnage taxes and uniformity of reports. Allen Baker, supervisor of the Grain and Chemical Division, would like to see national standards applied.

### Tennessee

Tennessee fertilizer sales in 1958-59 showed an increase of more than 17 percent over the preceding year. For the year ending June 30, total tonnage exceeded 572,000 tons compared with 489,000 tons for 1957-58.

Soil testing in Tennessee has increased by 80 percent for the first half of 1959. 20,480 soil samples have been analyzed for the first

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GROUND COTTON BUR ASH, 38/42% K<sub>2</sub>O Potash

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## TWO IMPORTANT ANNOUNCEMENTS TO ARMOUR'S FRIENDS IN THE FERTILIZER INDUSTRY

# 1. 2.

Armour has acquired and is now operating the Nitrogen plant of the Mississippi River Chemical Company at Crystal City, Missouri.

To better reflect our broadened scope of service, Armour Fertilizer Works is now known as ARMOUR AGRICULTURAL CHEMICAL COMPANY.

Now, more than ever, Armour is in a position to serve farmers and home owners with a complete line of fertilizers:

- Armour's complete line of farm fertilizers in recommended analyses including the famous COMMERCIAL VERTAGREEN.
- Armour's complete line of materials: 45% Triple Superphosphate, Phosphate Rock, Ammonium Nitrate, Nitrogen Solutions and Anhydrous Ammonia.
- Armour's complete Specialty Vertagreen Plant Food line for the lawn and garden trade.

While our name has changed, our tradition of friendly service and quality products remains the same.



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FERTILIZER  
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CHEMICAL  
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six months of 1959 as compared with 11,370 samples for the same period in 1958.

#### Texas

The Texas Fertilizer Committee has made no changes, in the list of approved ratios and minimum grades.

The approved ratios and minimum grades during the year starting September 1, 1959, are:

0-1-1 (0-14-14); 0-2-1 (0-16-8); 1-1-0 (10-10-0); 1-1-1 (8-8-8); 1-2-0 (7-14-0); 1-2-1 (6-12-6); 1-2-2 (5-10-10); 1-2-3 (4-8-12); 1-4-4 (3-12-12); 2-1-0 (14-7-0); 2-1-1 (12-6-6); 2-2-1 (10-10-5).

#### Wyoming

O. Henry Engendorff, Wyoming deputy commissioner of agriculture, has announced that enforcement of

fertilizer laws has been assigned to the Division of Chemical and Bacteriological Laboratories. All future correspondence regarding fertilizer should be addressed to Michael Purko, State Chemist and Director, Chemical and Bacteriological Laboratory, Wyoming Department of Agriculture, P. O. Box 656, Laramie, Wyoming.

## CLASSIFIED ADVERTISING

**RATES:** single issue, 8c per word; two issues, 12c per word; three issues, 15c per word; add 4c per word for each insertion beyond three issues. 'For Sale', 'Exchange' and 'Wanted' advertisements accepted for this column must be paid in advance.

### POSITION WANTED

**WANTED:** Position as Plant Manager or Superintendent of fertilizer plant. Have been continuously employed for 25 years in fertilizer production. Am forty-three years of age, married, have three children. Twenty-five years experience as plant manager and production manager in the production of fertilizers and phosphates. Have supervised the building of 3 complete plants, as well as installing 5 granulating units, and operating the same. Am familiar with formulating and all phases of fertilizer production, both normal and triple phosphate. Have lived in the South all my life and would prefer to locate in Florida or some southern state. Can furnish references if required. Reply Box 27, % Commercial Fertilizer, 75 - 3rd St., N. W. Atlanta 8, Ga.

**DESIRE TO RELOCATE IN SOUTH EAST:** Over 12 years experience with same firm in sales and sales management of fertilizer and pesticide basic ingredients. Presently employed Assistant Management position administering sales and activities of over 50 people. Present volume of around 20 million. Compensation commensurate with performance. Reply Box # 28, % Commercial Fertilizer and Plant Food Industry, 75 - 3rd St., N. W., Atlanta 8, Ga.

**SITUATION WANTED**—If you are looking for a man of proven ability in sales and management, settled, sober and hard working, I'm your man. Hold two college Degrees in Agriculture, 40 years of age, married and one child. Can give highest references. At present hold next to top executive position in an old and well established firm doing multi-million dollar business annually. Desire change for personal reasons. Box #30, c/o Commercial Fertilizer, 75 Third St. N. W., Atlanta 8, Ga.

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### HELP WANTED

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**SALESMEN** to handle a side line of Dust Masks, Goggles, First Aid Kits, on an exclusive basis. Old Established house. Write advising territory covered. General Scientific Equipment Co., Philadelphia 50, Pa.

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**FOR SALE:** 2-7'6" x 55' and 80" x 65' Rotary Dryers, 3 - Louisville 6" x 50' Rotary Steam Tube Dryers, also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. BRILL EQUIPMENT COMPANY, 2401 Third Ave., New York 51, N. Y.

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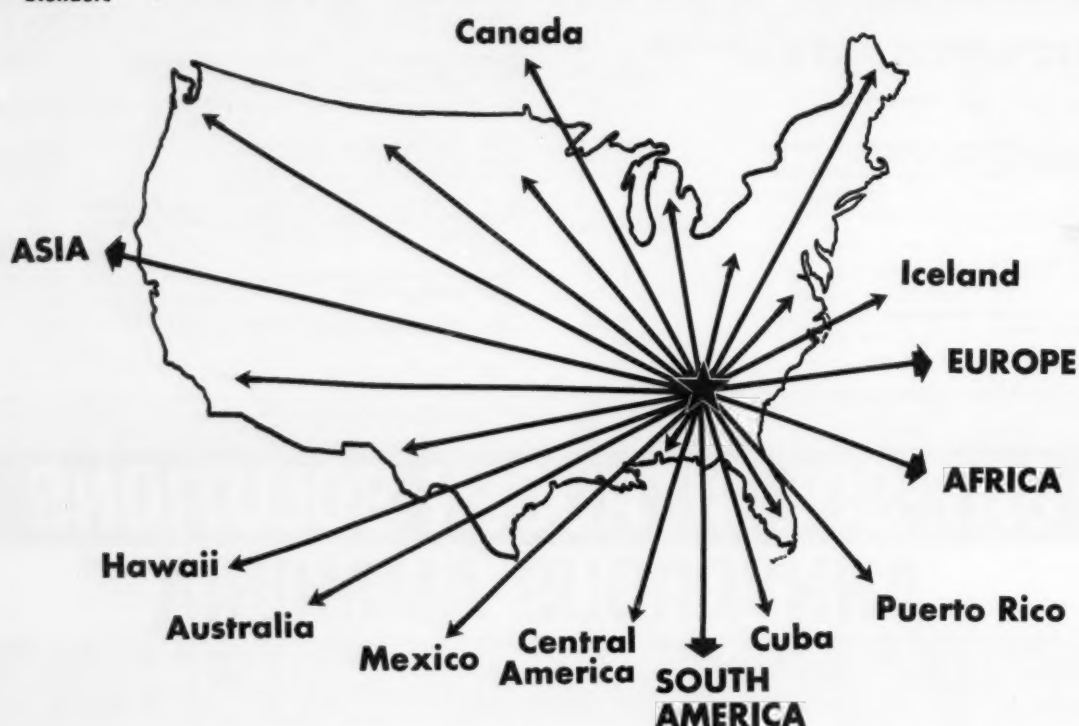
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